

# **Engineering Design Report – Levee Zone Interim Action for Cleanup**

## **BNSF Former Maintenance and Fueling Facility Skykomish, Washington**

**Prepared by:**

**The RETEC Group, Inc.  
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**RETEC Project Number: BN050-16423-520**

**Prepared for:**

**BNSF Railway Company  
2454 Occidental Street, Suite 1A  
Seattle, Washington 98134**

**May 3, 2006**

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**May 3, 2006**

# Table of Contents

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1	Introduction.....	1-1
1.1	Site Background and History .....	1-1
1.2	Existing Levee Conditions .....	1-2
1.2.1	Levee Topography .....	1-3
1.2.2	Subsurface Soil Conditions .....	1-3
1.2.3	Hydrology .....	1-4
1.2.4	Hydraulics .....	1-4
1.2.5	Riverbed.....	1-4
1.2.6	Contamination.....	1-5
1.2.7	Habitat.....	1-5
1.3	Upland Area.....	1-6
1.3.1	Barrier Wall .....	1-7
1.3.2	Utilities.....	1-7
1.4	Public Access .....	1-8
1.5	Overview of Interim Action for Cleanup.....	1-8
2	Regulatory Framework .....	2-1
2.1	MTCA Design Requirements .....	2-1
2.2	Applicable or Relevant and Appropriate Requirements .....	2-1
2.2.1	Health and Safety Regulations.....	2-1
2.2.2	Stormwater Management .....	2-3
2.2.3	Noise Control .....	2-4
2.2.4	Waste Characterization .....	2-4
2.2.5	Hauling of Excavated Soils.....	2-4
2.2.6	Solid Waste Management .....	2-4
2.2.7	Air Quality .....	2-4
2.2.8	Oil and Hazardous Substance Releases to Surface Water .....	2-5
2.2.9	Guidelines for Temporary Relocation of Residents.....	2-5
2.2.10	Historical and Archeological Cultural Resources .....	2-6
2.3	Permitting.....	2-6
2.3.1	Federal Permits .....	2-7
2.3.2	State Permits .....	2-10
2.3.3	Town of Skykomish Permits.....	2-12
2.3.4	King County.....	2-13
2.3.5	Native Sovereign Nations .....	2-14
3	Design Criteria.....	3-1
3.1	Design Requirements .....	3-1
3.1.1	Codes.....	3-1
3.1.2	Standards and Guidelines.....	3-2
3.2	South Fork Skykomish River.....	3-2
3.2.1	River Levels during Construction Months.....	3-3
3.2.2	Flooding Events .....	3-4
3.2.3	Fish.....	3-5
3.3	Shoring.....	3-7

# Table of Contents

---

3.4	Cofferdam .....	3-7
3.5	Excavation.....	3-8
3.5.1	Excavation Prism .....	3-9
3.5.2	Excavation Dewatering .....	3-10
3.5.3	Contingencies.....	3-10
3.6	Upland Source Control .....	3-11
3.7	Construction Water Treatment.....	3-11
3.8	Levee Design Sections.....	3-11
3.8.1	Levee Materials.....	3-12
3.9	Embankment Slope Protection.....	3-12
3.9.1	Armor Rock .....	3-12
3.9.2	Armor Rock Characteristics.....	3-13
3.9.3	Armor Rock Top and End Protection .....	3-14
3.9.4	Armor Rock Toe Protection.....	3-14
3.9.5	Delivery and Placement .....	3-15
3.9.6	Quality Control .....	3-15
3.10	Cleanup Standards .....	3-15
3.10.1	Soil .....	3-16
3.10.2	Groundwater .....	3-17
3.10.3	Sediments.....	3-17
3.10.4	Surface Water.....	3-17
3.11	Community Amenities .....	3-17
3.12	Construction Safety.....	3-19
3.13	Survey Control .....	3-20
3.14	EDR Amendment Protocol .....	3-21
4	Scope of Work .....	4-1
4.1	Approach.....	4-1
4.1.1	Solicitation Package.....	4-1
4.1.2	Drawings.....	4-1
4.2	Permits .....	4-1
4.3	Weather Related Contingency Plan .....	4-1
4.4	Mobilization and Site Preparation .....	4-2
4.4.1	Utility Locate .....	4-2
4.4.2	Clearing and Grubbing.....	4-2
4.4.3	Temporary Relocation of Structures.....	4-2
4.4.4	Shoring.....	4-3
4.4.5	Cofferdams.....	4-4
4.4.6	Spill Response.....	4-4
4.5	Temporary Facilities .....	4-4
4.5.1	Access/Haul Roads .....	4-4
4.5.2	Construction Offices .....	4-4
4.5.3	Utilities.....	4-5
4.5.4	Enclosures and Fencing .....	4-5
4.5.5	Sediment and Erosion Controls .....	4-5
4.5.6	Staging Areas .....	4-6

# Table of Contents

---

4.5.7	Spill/Emergency Response Equipment.....	4-6
4.6	Water Treatment Facilities.....	4-6
4.7	Excavation.....	4-7
4.7.1	Screening of Oversized Material .....	4-7
4.7.2	Stockpiling Uncontaminated Soil and Sediment .....	4-8
4.7.3	Transportation and Disposal of Contaminated Materials .....	4-8
4.7.4	Confirmation Sampling and Testing.....	4-8
4.7.5	Dewatering.....	4-9
4.8	Monitoring .....	4-10
4.8.1	Air Monitoring.....	4-10
4.8.2	Surface Water and Discharge Monitoring .....	4-10
4.8.3	Cofferdam Monitoring.....	4-11
4.8.4	Performance Monitoring.....	4-11
4.9	Backfilling.....	4-11
4.10	Replacement and Restoration .....	4-12
4.11	Stormwater Sewer System .....	4-12
5	Levee Construction Control.....	5-1
5.1	Habitat Restoration .....	5-1
5.2	Levee Landscaping and River Access .....	5-2
5.3	Community Concerns .....	5-3
5.4	Schedule.....	5-6
6	Construction Quality Assurance .....	6-1
6.1	Quality Assurance Monitoring Structure.....	6-1
6.2	Construction Quality Requirements.....	6-1
6.2.1	Health and Safety.....	6-1
6.2.2	Performance Standards .....	6-2
6.2.3	Record Keeping and Reporting.....	6-4
7	References.....	7-1

# List of Tables

---

Table 2-1	Remediation Levels and Cleanup Levels.....	2-1
Table 3-1	Mean Monthly Stages of the South Fork of the Skykomish River at the 5 <sup>th</sup> Street Bridge .....	3-3
Table 3-2	Flood Frequency Elevations and Discharges at the Town of Skykomish.....	3-4
Table 6-1	Construction Performance Standards.....	6-3

# List of Figures

---

Figure C-1	Title Sheet, Index, and Site Location Maps
Figure C-2	Legend and General Notes
Figure C-3	Existing Site Plan Index and Survey Control
Figure C-4	Existing Plan West
Figure C-5	Existing Plan East
Figure C-6	Existing Levee Sections
Figure C-7	Sediment and Erosion Control Plan
Figure C-8	Sediment and Erosion Control Details – Sheet 1 of 3
Figure C-9	Sediment and Erosion Control Details – Sheet 2 of 3
Figure C-10	Sediment and Erosion Control Details – Sheet 3 of 3
Figure C-11	Construction Layout Plan
Figure C-12	Demolition Plan
Figure C-13	Excavation Plan West
Figure C-14	Excavation Plan East
Figure C-15	Excavation Sections
Figure C-16	Excavation Details
Figure C-17	Final Grading Plan West
Figure C-18	Final Grading Plan East
Figure C-19	Final Levee Sections
Figure C-20	Final Levee Details
Figure C-21	Restoration Plan
Figure C-22	Final Roadway Profile Sheet 1 of 2
Figure C-23	Final Roadway Profile Sheet 2 of 2
Figure C-24	Final Details
Figure C-25	Landscape Details/Plant Placement
Figure C-26	Cross Section Details
Figure P-1	Construction Water Treatment System Piping and Instrumentation Diagram

# List of Appendices

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Appendix A	Levee and Barrier Wall As-Built Drawings
Appendix B	River and Levee Supplemental Site Investigation Report
Appendix C	South Fork Skykomish River Mean Discharge Ranking in Summer
Appendix D	Scour Hydraulic Analysis
Appendix E	Dewatering Calculations
Appendix F	EDR Amendment Form
Appendix G	Sampling and Analysis Plan
Appendix H	Stormwater System Design

# 1 Introduction

This document presents the *Engineering Design Report – Levee Zone Interim Action for Cleanup* (EDR) for the Levee Zone and part of the Northwest Developed Zone of the BNSF Railway Company's Former Maintenance and Fueling Facility located in Skykomish, Washington, prepared by The RETEC Group, Inc. (RETEC) for the BNSF Railway Company (BNSF). The EDR is one in a series of documents required under the Model Toxics Control Act (MTCA; Revised Code of Washington 70.105D; Washington Administration Code 173-340) cleanup process. The *Remedial Investigation* (RI) (RETEC, 1996) and the *Supplemental RI* (RETEC, 2002) presented the results of investigations of the nature and extent of contamination at the site. The Feasibility Studies (RETEC, 1999 and 2005) evaluated the extent of impacts and the feasibility of remedial alternatives for the site. BNSF completed the RI, Supplemental RI and the FS pursuant to Agreed Order No. DE 91TC-N213.

A site-wide Cleanup Action Plan (CAP) is being written by the Washington State Department of Ecology (Ecology) and that document will guide all remedial actions of the Former BNSF Railway Maintenance and Fueling Facility. BNSF submitted a Draft CAP Outline to Ecology on September 16, 2005, pursuant to Agreed Order No. DE 91TC-N213.

BNSF and Ecology initiated discussions early in 2005 regarding a mutually acceptable final cleanup action for Skykomish; these discussions are on-going. BNSF voluntarily began early design, access and permitting work so that remediation of the Levee Zone might proceed in 2006 as the initial phase of a final cleanup action that is acceptable to BNSF, Ecology and the community. This initial phase of work will be an Interim Action for Cleanup performed by BNSF at Ecology's direction pursuant to an Agreed Order. This work will take place in the Levee Zone and part of the Northwest Developed Zone of the Former BNSF Maintenance and Fueling Facility (referred to as the Project Area throughout this document). This document is BNSF's engineering design for final remedial actions at the levee and South Fork Skykomish River. These actions consist of temporary relocation of five residences, excavation of the levee, underlying soils and sediments along the south bank of the South Fork Skykomish River, reconstruction of the levee, and restoration of natural resources, private property and public infrastructure that are disturbed by the remedial action.

## 1.1 Site Background and History

The Former BNSF Maintenance and Fueling Facility (site) in the east King County town of Skykomish is owned and operated by BNSF. The location of Skykomish (Town) and the BNSF facility is shown on Figures C-1 and C-3. Historical activities since the facility opened in the late 1890s included refueling and maintaining locomotives and operating an electrical substation

for electric engines. Some of these activities released contaminants to the surrounding environment. BNSF has accepted responsibility for cleaning this historical contamination at the site consistent with MTCA.

Bunker and diesel fuel were stored in above and underground storage tanks at the site until 1974, when BNSF discontinued most fuel handling activities at the Skykomish facility. The BNSF facility is currently used as a base of operations for track maintenance and snow removal crews.

Railroad Avenue separates BNSF property from the main commercial district of the Town. In early 1991, Ecology designated the Former BNSF Fueling and Maintenance Facility as a high priority cleanup site. Later that year, BNSF indicated a desire to initiate a Remedial Investigation/Feasibility Study (RI/FS) in accordance with MTCA. At that time, formal negotiations for Agreed Order No. DE 91TC-N213 were initiated. Negotiations were completed in mid-1993. Following a public comment period, the Agreed Order, which includes detailed work plans for the RI/FS process and early interim action for cleanup work, was signed by Ecology and BNSF. BNSF and Ecology signed a separate agreed order (No. DE 01TCPNR-2800) in 2001 for additional interim action for cleanup work near the South Fork Skykomish River and the levee west of Fifth Street. The work required by the 2001 order is now complete.

Portions of the commercial and residential zones including 13 historic buildings and the Skykomish Bridge are registered in the National Register of Historic Places. The levee remediation will involve moving one historic building—the Teacherage—located near West River Road to allow for the excavation and levee reconstruction. Portions of the school yard may be used as staging areas.

The levee itself was built by the U.S. Army Corps of Engineers (USACE) and is currently owned by the Town and maintained by King County. King County will continue to maintain the levee during and after levee remediation. The Town of Skykomish owns and will continue to own the levee and the land beneath the levee. BNSF and the Town are currently negotiating access. BNSF and/or Ecology will pursue access agreements with the property owners affected by this phase of cleanup. Washington State owns the sediments below the ordinary high water mark, defined as the annual high water mark of 922.0 ft NAVD88. The Department of Natural Resources manages the sediments for the state.

## **1.2 Existing Levee Conditions**

This section describes the existing conditions in the project area including the existing levee, groundwater hydraulics, contamination, and barrier wall. The existing levee, forming the south bank of the South Fork Skykomish River, was designed by the USACE in 1951 (Drawing No. E-2-6-74). It consists of

6,900 cubic yards (cy) of embankment material (assumed to be sand and gravel) placed on existing ground and of 2,000 cy of armor rock (12-inch minus rock) placed as a 2-foot thick layer over the embankment material on a 2:1 slope.

### **1.2.1 Levee Topography**

The top of the levee is at approximate elevation 930 feet (NAVD88). The levee is approximately 550 feet long and slopes down to the river with a 2:1 slope to a swale at elevation 916.5 feet. A bank-parallel river bar rises to about elevation 917 feet and is about 10 feet wide, before sloping into the river. A topographic survey was completed by Bush, Roed, & Hitchings, Inc. in May 2005. The resulting survey data are shown on Figure C-3.

### **1.2.2 Subsurface Soil Conditions**

Lithologic information for the site is presented in the Supplemental RI report (RETEC, 2002). The primary soil units in Skykomish consist of at least 50 feet (corresponding to total depth of deep borings) of sand and gravelly sand with discontinuous silty and clayey lenses. The local lithology can be broken up into three distinct units within the shallow Quaternary deposits found underlying the site: (1) upper topsoil and fill (1 to 2 feet thick); (2) gravelly sand and sandy gravel (11 to 22 feet thick); and (3) lower silt (3 to 10.5 feet thick where encountered).

Subsurface soil lithology encountered during the installation of the barrier wall beneath West River Road and parallel to the levee are illustrated on the as-built drawing included in Appendix A. As shown on the as-built drawings, the subsurface soils in the barrier wall area consisted of mostly sand, gravel and cobbles, with scattered boulders and discontinuous silt deposits. The most significant silt deposit was encountered at a depth of approximately 6 feet below ground surface (bgs) between Station 1+20 and Station 2+50, shown in Figure 3-2 of Appendix A. This silt deposit corresponds to and is consistent with the product-free zone typically shown on the light nonaqueous phase liquid (LNAPL) plume maps for the site (for example, Figure 3-1 of the FS). Generally, boulders were present at deeper zones of the barrier wall trench. Free product was encountered at depths between 4 and 8 feet bgs between Station 2+20 and Station 5+10. Locations of the free product encountered during excavation appeared to be consistent with the recent 2005 and 2006 site data.

Subsurface conditions encountered during investigation of the levee and river bottom are illustrated on cross-sections A-A' (Figure 4-2) and B-B' (Figure 4-3) included in the *River and Levee Supplemental Site Investigation Report* (Appendix B).

Based on the USACE levee construction as-built drawings (USACE, 1951), the levee embankment was constructed on native soils. Fill materials were placed above the pre-existing ground surface where the elevations were lower than the design levee elevations. The fill materials are comprised of mostly sand and gravel. Pre-existing sewer and storm drain pipes were shown to extend through the embankment to the river side, although pre-trenching operations associated with the barrier wall demonstrated the existence of only two storm sewer lines penetrating through the levee.

### **1.2.3 Hydrology**

The watershed of the South Fork Skykomish River above the Project Area is approximately 242 square miles. The river headwaters are on the western flanks of the Cascade Mountains of eastern King and Snohomish Counties. The river flow mostly results from rain in the fall and snowmelt in the winter and spring. The river stage (water level elevation) at the levee site is measured by a sonic gage mounted on the 5<sup>th</sup> Street Bridge (The John Glick Henry Memorial Bridge 2/115A). Stages are measured and recorded by the Snohomish County Department of Public Works – Surface Water Management. The period for the gage is from May 12, 1999 to the present. The correction from river stage to elevation is zero (0.0) feet on the river stage gage equals 914.2 feet NAVD88.

### **1.2.4 Hydraulics**

The water stage at the 5<sup>th</sup> Street Bridge gage can be correlated with the flow in the South Fork of the Skykomish River at the levee by extrapolating flood study data. The flood study data (FEMA, 2001) include elevations and peak discharges for the 10-year, 50-year, 100-year, and 500-year flood levels. River peak discharge and flood stage are assumed to be directly related (see Appendix C).

### **1.2.5 Riverbed**

The riverbed is composed of sand, gravel, and cobbles. Based on a visual inspection of the riverbed, the estimated median grain size (D50) is 2 inches (50 mm, 0.17 feet). The coarse, cohesionless nature of the riverbed material suggests that the riverbed should support in-river cofferdams (necessary for levee excavation) without significant settlement. The riverbed load is assumed to be subject to some transport during flood stages of the river and the distribution of the bed load is assumed to change seasonally in response to river flow.

The riverbed in front of the levee slopes from 917.11 feet (NAVD88) just downstream of the bridge to 915.64 feet at 550 feet downstream of the bridge. This is a slope of 0.0028 (1.47 feet/530 feet = 0.28 ft/100 ft = 0.16°).

Localized scour may occur in the riverbed due to flood flows and a cofferdam restricting the river cross-section. Calculations indicate that during flood flows in excess of 12,000 cfs the local scour is on the order of 2 feet (see Appendix D).

Sediments are defined at this site as the solids which directly underlie the area beneath and waterward of the ordinary high water mark (OHWM). The OHWM was estimated based on the average annual mean high water mark (MHW) based on historic river gauge and flow measurements. The MHW has been identified as 922 feet in elevation, but which remains somewhat dependent upon the elevation measurement location. Generally, the MHW at the eastern end of the levee is approximately 926 feet in elevation, and the MHW at the western end of the levee is approximately 921 feet in elevation.

### **1.2.6 Contamination**

The contamination in the levee area consists of free petroleum product (LNAPL). The free product acts as sources for both soil and sediment contamination and dissolved hydrocarbons in groundwater. Free product is also seeping into the South Fork Skykomish River adjacent to the upland plumes.

BNSF's remedial approach for the levee involves excavating portions of the levee and upgradient areas to remove free product and contaminated soil and, excavating surface and subsurface sediment along and within the South Fork Skykomish River at the base of the levee. The need for further groundwater treatment (i.e., air sparging) will depend on the scope, nature and timing of additional upland remediation activities.

### **1.2.7 Habitat**

The current shoreline along the levee provides low velocity, seasonal aquatic edge habitat for juvenile salmon. The shoreline habitat along the base of the existing levee provides edges of large armor rock and cobble substrate of approximately 1-2 feet in height. This habitat is seasonally available when river flows are above approximately 2,500 cfs, typically from November through January, and again from May through July.

This shoreline edge habitat offers rearing and refuge habitat to juvenile salmonids. The larger armor rock and boulders also reduce flow velocities near the bank by creating eddies where water flows around these larger substrates. Low-velocity areas are also present within the interstices of the larger boulders and armor rock.

Overhanging vegetation present throughout the Project Area provides some cover for juvenile salmonids and provides shade that contributes to decreased water temperatures. It also offers foraging opportunities when insects fall from the vegetation. Overhanging vegetation in this area typically consists of

young willow (*Salix* spp.) and pacific ninebark (*Physocarpus capitatus*), with young red alder (*Alnus rubra*) and black cottonwood (*Populus balsamifera*) present.

Salmonid species found in the Project Area include chinook, coho, pink, and chum salmon, and steelhead and bull trout (Pentec, 1999). Suitable spawning habitat for salmonids does not exist within the Project Area; however, river sockeye salmon were recently identified to be spawning within the Project Area. In addition, several species of juvenile salmonids utilize the Project Area for migration, rearing, and refuge habitat. Several of these species would be expected to utilize the shoreline edge of the Project Area for rearing habitat.

Outmigrating coho and bull trout juveniles could also be expected to use this habitat, although their use is limited in extent given these species typically rear for one year or more in upstream areas before emigrating. Data on bull trout use of the Project Area is limited. Data on juvenile chinook use of South Fork habitats above Sunset Falls is also scarce; however, use of Project Area habitat for rearing is likely for chinook juveniles from Beckel, Foss, and Tye Rivers (Pentec, 1999). Additional information on fish species present in the South Fork Skykomish River is included in the Draft Final Environmental Impact Statement (EIS) (RETEC, 2003) and Skykomish Levee Remediation Project Biological Evaluation (BE) (Grette Associates, 2005).

The riparian zone along the levee is of low quality for other terrestrial species due to the extent of development close to the shoreline. Animals that may use the shoreline habitat include, but are not limited to, common crow, coyote, raccoon, and mink.

### 1.3 Upland Area

The site is located within the Skykomish River valley. The glaciofluvial sediments filling the valley consist mainly of poorly- to moderately-sorted sand, gravel, and cobbles. The base of the sediments is estimated to be located 200 to 250 feet bgs. The upper 50 feet of subsurface soils have been described in the subsurface soil conditions section above.

The aquifer at the site is unconfined to a depth of at least 47 feet bgs based on previous investigations. The hydraulic conductivities of aquifer materials at the site were determined via slug tests to range from 0.4 feet per day ( $1.42 \times 10^{-4}$  cm/s) to 79 feet per day ( $2.79 \times 10^{-2}$  cm/s) during the remedial site investigation (RI; RETEC, 1996). An average hydraulic conductivity of 50 feet per day has been used in previous groundwater modeling work performed for the site.

Groundwater occurs at a shallow depth beneath the site (generally 5 to 15 feet bgs). Groundwater elevations are the highest at the southeast corner of the site

and decrease northwestward toward the Skykomish River, indicating groundwater flow is generally from the southeast to the northwest. Historic gauging data indicate the seasonal variation in groundwater elevation ranged from about 2.5 to 10.5 feet bgs in the area where the barrier wall was constructed.

Groundwater levels are generally higher during late fall, winter, and spring (November to April) and lower in the summer and early fall (June to early November). For a potentiometric surface map showing the groundwater gradient in April 1998 and a figure showing the groundwater gradient in September 1998, please see Figures 6-8 and 6-9 from the Supplemental Remedial Investigation (RETEC, 2002). These figures are representative of the typical seasonal high and low groundwater levels, respectively, at the site and are consistent with more recent gauging data.

### **1.3.1 Barrier Wall**

A continuous subsurface barrier wall was constructed parallel to the South Fork Skykomish River in August 2001 as part of the interim action for cleanup to block free product from entering the river. The alignment of the barrier wall is shown on the as-built drawing in Appendix A. Several wing walls were added for protection against LNAPL flow around the downgradient (i.e., west) end of the wall and to enhance product recovery. The barrier wall was constructed using cement-bentonite (CB) slurry wall method. Based on the completion report (RETEC, 2002b), the barrier wall is 572 feet long, and extends approximately 15 feet bgs vertically from near the ground surface (above the water table) to below the seasonal low table. The barrier wall was constructed of materials that are compatible with, and capable of, withstanding long-term exposure to bunker C and diesel petroleum hydrocarbons present in the LNAPL plume. The average hydraulic conductivity of the barrier wall is  $9.0 \times 10^{-6}$  cm/sec. The wet density of the CB slurry ranged from 74 to 85 pounds per cubic foot (pcf), with an average density of approximately 80 pcf.

### **1.3.2 Utilities**

Overhead power and telephone lines are present within the Project Area. These utilities will be relocated prior to the commencement of construction work by the utilities. The utilities within the proposed levee remediation area will be located by using public utility locating services (e.g., Washington Underground Utility Location Center at 1-800-424-5555) and private utility locating services to ensure that all utilities are addressed.

Based on the barrier wall completion report (RETEC, 2002b), during the barrier wall construction in August 2001, one water supply line and a previously damaged storm sewer pipe were located along West River Road corridor. The locations of the pipes are shown on the as-built drawing in

Appendix A. These pipes will be replaced as part of this interim action for cleanup.

## 1.4 Public Access

Public access to the levee is currently not provided. A dirt path is located immediately west of the 5<sup>th</sup> Street Bridge, but blackberry bushes and other vegetation covers much of the top (flat) portion of the levee restricting access. Also, signs are posted along W. River Road stating “*Oil discharge to river. Do not access.*” During cleanup work, public access will be controlled to prevent exposure to hazardous substances and minimize physical safety hazards. Additionally, five residences will be temporarily relocated to facilitate the excavation.

## 1.5 Overview of Interim Action for Cleanup

The Levee Zone Interim Action for Cleanup is one component of the overall, final cleanup action for the site. This interim action for cleanup is intended to be the final cleanup for the levee zone and will be consistent with Ecology’s Cleanup Action Plan to be completed along with a Consent Decree in the fall of 2006. The interim action for cleanup will consist of excavating and replacing the flood control levee and underlying contaminated sand and gravel, excavating contaminated sediment and the underlying impacted sand and gravel adjacent to the levee and in the riverbed to the extent practical given the site conditions, and excavation of upland (Northwest Developed Zone) areas. The interim action for cleanup also includes restoration of the Levee Zone including replacement foundations and temporary septic systems for the temporarily relocated residences, a replacement stormwater sewer system, and replacement of the levee. The EDR is one of many documents being prepared to guide this work. Other documents that will guide the work include the contractor specifications and plans and the Technical Execution Plan that will be prepared by the contractor.

## 2 Regulatory Framework

### 2.1 MTCA Design Requirements

This remedial design is being implemented in accordance with the Washington Administration Code (WAC) 173-340-400 – Implementation of the Cleanup Action. This chapter is a part of WAC 173-340 also known as the MTCA Cleanup Regulations. Site-specific cleanup levels (CULs) and remediation levels (RLs) were developed by Ecology and are presented in the FS (RETEC, 2005a) and in Table 2-1. These criteria define the extent of remediation required to prevent public and ecological receptor exposure to impacted areas of the site.

**Table 2-1 Remediation Levels and Cleanup Levels**

Environmental Medium	Remediation Level	Cleanup Level
Soil	3,400 mg/kg NWTPH-Dx	22 mg/kg NWTPH-Dx and VPH/EPH
Groundwater	477 µg/L EPH/VPH and NWTPH-Dx beneath residential and commercial areas	208 µg/L NWTPH-Dx and VPH/EPH
Sediment	NA	Bioassay Pass/Fail or 40.9 mg/kg NWTPH-Dx and VPH/EPH
Surface Water	NA	208 µg/L NWTPH-Dx and VPH/EPH

NA – Not applicable

### 2.2 Applicable or Relevant and Appropriate Requirements

Other regulatory requirements include health and safety regulations, stormwater management, noise and odor control, waste characterization, hauling of excavated materials, zoning and land use, historic preservation, solid waste management, excavation, backfilling, grading, endangered species protection, air and water quality, and relocation of residents. These are described further in Sections 2.2.1 through 2.2.9.

#### 2.2.1 Health and Safety Regulations

Health and safety regulations are specified in the Washington Administrative Code, Title 296—Department of Labor & Industries, Chapter 296-155WAC. This code specifies health and safety standards for responding to releases or substantial threats of releases of hazardous substances at hazardous waste sites. Occupational Safety and Health Administration (OSHA) specifies health and safety requirements for hazardous waste sites (29 CFR 1910.120).

All operating personnel and all operations will be subject to compliance with OSHA and Washington Industrial Safety and Health Act (WISHA) health and safety requirements. All personnel will be required to receive the necessary training and supervision, and follow the applicable health and safety protocols. Construction activities will be conducted within the guidelines established in a site-specific health and safety plan for this project.

Applicable health and safety regulations and publications include, but are not limited to, the following:

- OSHA, Title 29 CFR Part 1910, Occupational Safety and Health Standards, and Title 29 CFR Part 1926, Safety and Health Regulations for Construction
- National Fire Protection Association (NFPA), Flammable and Combustible Liquids Code, NFPA 30, most recent revision
- United States Environmental Protection Agency (USEPA), Standard Operating Safety Guidelines, July 1988
- United States Department of Health and Human Services (DHHS), “Manual of Analytical Methods,” 3<sup>rd</sup> Edition, Volumes I and II, DHHS (National Institute for Occupational Safety and Health [NIOSH]) Publication 84-100
- American National Standards Institute (ANSI), Practices for Respiratory Protection, Z88.2, most recent version
- ANSI, Emergency Eyewash and Shower Equipment, Z358.1, most recent version
- ANSI, Protective Footwear Z41.1, most recent version
- ANSI, Respirator Use Physical Qualification for Personnel, Z88.6, 1984
- ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1, most recent version
- NIOSH/OSHA/United States Coast Guard (USCG)/USEPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, DHHS/Public Health Services (PHS)/Centers for Disease Control (CDC)/NIOSH, October 1985
- NIOSH Pocket Guide to Chemical Hazards, DHHS/PHS/CDC/NIOSH, June, 2000 or most recent

- USEPA, Health and Safety Requirements for Personnel Engaged in Field Activities, USEPA Order No. 1440.2
- Departments of Transportation (DOT) Standards and Regulations, 49 CFR 171 and 49 CFR 172
- American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices (most recent version)
- Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, USEPA/625/R-96/010b, January 1999
- Washington Department of Labor and Industries, WAC 296-155.

Where two or more regulations/documents conflict the one(s) offering the greatest degree of protection will be applied. The on-site contractor(s) will comply with any and all state and local ordinances and regulations. A site-specific Health and Safety Plan will be implemented.

Personnel involved in the construction of the project will be required to comply with the health and safety training requirements commensurate with the task(s) they are performing. Prior to initiating the construction work, the contractor(s) and subcontractor(s) will provide documentation of employee and applicable sub-subcontractor training and medical certifications required by 20 CFR 1910.120, or other regulations as appropriate for the specific tasks to be performed. Additionally, if a specific contractor will access BNSF property as part of their work, they must provide documentation that they have received BNSF Contractor Safety Orientation training available at the Internet Web site: [http://contractororientation.com/new\\_site/default.asp](http://contractororientation.com/new_site/default.asp).

## **2.2.2 Stormwater Management**

Stormwater management must adhere to the substantive requirements of both the General Permit to Discharge Stormwater Associated with Construction and the General Stormwater Permit for Industrial Facilities. Both of the stormwater permits are National Pollution Discharge Elimination System Permits and are incorporated into the Individual National Pollution Discharge Elimination System (NPDES) Permit that dictates discharges from the construction water treatment system. As part of the requirements for the Construction NPDES permit, a Stormwater Pollution Prevention Plan will be prepared that includes Best Management Practices (BMPs) for managing stormwater during remedial activities. These BMPs are outlined in the Stormwater Management Manual for Western Washington (Ecology, 2005). A site-specific Operations and Monitoring Plan for the temporary water treatment system will be prepared 30 days from the date the NPDES is issued.

### **2.2.3 Noise Control**

The Washington Noise Control Act (RCW 70.107; WAC 173-60) provides maximum permissible decibel (dB) levels for all site activities, construction equipment and portable powered equipment in temporary locations. Site activities will comply with these regulations and the Town's Noise Ordinance (347).

### **2.2.4 Waste Characterization**

Waste generated during remediation will be characterized as dangerous (hazardous) or non-hazardous in accordance with WAC 173-303. Based on the historical data for the site, it is anticipated that excavated materials will be classified as non-hazardous.

### **2.2.5 Hauling of Excavated Soils**

The Revised Code of Washington (RCW) Title 46, Motor Vehicles, governs the transportation of non-hazardous soils. Transportation of dangerous waste from the site will comply with the RCW 46 code and the requirements of WAC 173-303-240 through WAC 173-303-270. WAC 173-303-240 lists the requirements for transporters, while the other sections detail the requirements for the actual transport and record keeping. The transporter will have a current EPA/State identification number and abide by these codes.

WAC 173-303-190 provides the requirements necessary for preparing dangerous waste for transport. These requirements include specifics for packaging, labeling, marking and placarding.

### **2.2.6 Solid Waste Management**

Requirements for solid waste management are applicable to the non-hazardous waste generated during remedial activities that is to be disposed of off-site. WAC 173-350 outlines the requirements that will be followed for the proper handling of all solid waste materials. A Solid Waste Management Plan is being developed in accordance with the NPDES Permit.

### **2.2.7 Air Quality**

The Puget Sound Clean Air Agency (PSCAA) and Ecology (WAC 173-460) provide air emissions criteria for the site. Measures will be provided to suppress any fugitive dust generated during site excavation and grading that exceeds these criteria. Reasonable measures as outlined in PSCAA Regulation I Section 9.15 include:

- The use of control equipment, enclosures, and wet (or chemical) suppression techniques, as practical, and curtailment during high winds

- Surfacing roadways and parking areas with asphalt, concrete, or gravel
- Treating temporary, low-traffic areas (e.g., construction sites) with water or chemical stabilizers, reducing vehicle speeds, constructing pavement or riprap exit aprons, and cleaning vehicle undercarriages before they exit to prevent the track-out of mud or dirt onto paved public roadways
- Covering or wetting truck loads or allowing adequate freeboard to prevent the escape of dust-bearing materials.

The Site-Specific Health and Safety Plan and air monitoring plan will evaluate acceptable levels of particulates and organic vapors in the air that are protective of site workers and adjacent residents during remediation efforts based on organics and metal concentrations found in site soils and the potential for this material to become airborne. The air monitoring plan will include perimeter air monitoring protocols and action levels.

## **2.2.8 Oil and Hazardous Substance Releases to Surface Water**

Section 311 of the Clean Water Act addresses pollution from oil and hazardous substance releases, providing EPA and the U.S. Coast Guard with the authority to establish a program for preventing, preparing for, and responding to oil spills that occur in waters of the United States. RCW 90.56 outlines plans, standards, and penalties associated with oil and hazardous substance spill prevention and response. All work will comply with these federal and state regulations. A Spill Response contractor will be on-call for the duration of the remedial action. The Spill Response Contractor will be responsible for developing the spill response plan for the interim action for cleanup. Additionally, the general contractor will be required to keep a minimum amount of spill response materials such as absorbent booms and pads on-site for immediate deployment in the event of a release to the South Fork Skykomish River. The general contractor will not have the capabilities to fully respond to a significant spill in the South Fork Skykomish River but will be able to respond immediately to a small release.

## **2.2.9 Guidelines for Temporary Relocation of Residents**

EnviroIssues (acting for BNSF) and Ecology have developed guidelines for the temporary relocation of residents from the Project Area and are referenced in the Agreed Order Exhibit D. These guidelines were drawn from Federal and State laws applicable to the relocation of residents and include:

- Provide adequate and timely notification to temporarily relocated residents.
- Identify and provide comparable temporary housing for affected residents for the duration of the project.
- Reimburse eligible affected residents of reasonable out-of-pocket expenses incurred in connection with the temporary relocation, including the cost of moving to and from the temporary housing, the monthly rent and utility costs of the temporary housing, and storage of residents' personal property for the duration of the project.
- Provide temporary relocation of residential dwellings as outlined in the project plan. Determine appropriate and agreeable options for returning residential dwellings to real estate property. This will include documentation of original conditions and specifying what can be salvaged or replaced in kind.
- Provide regular communications to temporarily displaced residents. Develop a process for reporting and addressing complaints and concerns including meetings with affected home owners as needed.
- Payment for eligible claims will be made as soon as possible following a move or receipt of documentation to support the claim. Advance payments will be considered for residents who demonstrate a need.

These guidelines will be implemented throughout the cleanup.

## **2.2.10 Historical and Archeological Cultural Resources**

Northwest Archeological Associates, Incorporated (NWAA) completed a cultural resource assessment for the site. In the cultural resource assessment, NWAA identified areas where there is a potential for historical and archeological cultural resources to be encountered. During ground disturbing activities in these areas, an archeologist will be on-site. NWAA is currently developing a Cultural Resources Monitoring and Discovery plan that will be implemented prior to and during the cleanup.

## **2.3 Permitting**

Certain federal permits are required for the levee remediation (levee remediation permits). All proposed work will be conducted at Ecology's direction under a MTCA Order. In accordance with Ecology Policy 130B

(Permit Exemptions for Remedial Actions under MTCA, February 17, 1995), and MTCA (RCW 70.105D.090), work conducted pursuant to a MTCA order is exempt from the procedural requirements of state and local permits, including chapters 70.94, 70.95, 70.105, 75.20 (Hydraulic Permit), and 90.58 (Shorelands) RCW. Chapter 90.48 (Water Quality) will not be exempted by Ecology due to the potential of significant water quality impacts. Ecology and BNSF must ensure that all local and state substantive requirements are addressed during remedial design, in lieu of obtaining local and state permits that are normally required.

For the levee remediation, federal permits will be required from the following agencies:

- USACE for a 404 Permit (Section 404 of the Clean Water Act), either individual or Nationwide 38 permit. The USACE will initiate consultation with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS), with respect to federally-listed threatened or endangered species or designated critical habitat prior to issuing a 404 Permit (Section 7 of the Endangered Species Act).
- Ecology (as the delegated federal authority) for a 401 Water Quality Certification (Section 401 of the Clean Water Act), unless the work is authorized under a nationwide 38 permit.
- Ecology (as the delegated federal authority) for National Pollution Discharge Elimination System (NPDES) permits (Section 402 of the Clean Water Act).

A Joint Aquatic Resource Permit Application (JARPA) was submitted by BNSF to the Corps and Ecology as well as the appropriate state and local agencies. The application was submitted to the state and local agencies to assist those agencies in identifying applicable substantive requirements for Ecology and BNSF.

## **2.3.1 Federal Permits**

### **Section 404 Permit**

Activities requiring Section 404 permits include placing a structure, excavating (including land clearing), or discharging dredged or fill material in waters of the United States, including wetlands. This permit will be required because dredging (excavation) is planned for material waterward of the ordinary high water mark in the South Fork Skykomish River. The ordinary high water mark at this site is based on a vegetation survey.

The Section 404 permit may either be an individual permit or a Nationwide 38 permit, which is a permit designed for cleanup of hazardous and toxic waste. Generally, permitting times for Nationwide 38 permits are reduced.

### **Endangered Species Act Section 7 Compliance**

Section 7 of the Endangered Species Act (ESA) outlines the procedures for federal agencies (such as the USACE, called Action Agencies) to cooperate in order to conserve federally-listed threatened and endangered species (listed species) and designated critical habitats. ESA requires Action Agencies to consult or confer with the National Marine Fisheries Service (NMFS) and/or the US Fish and Wildlife Service (USFWS) (the Service Agencies) if a project requires federal approval or utilizes federal funding.

ESA Section 7 consultation applies to listed species and designated critical habitats. There are three types of consultations:

- 1) **Conferencing** – An informal process to determine listed species and a project’s potential impact to that species.
- 2) **Informal Consultation** – A more formal process whereby NMFS and USFWS determine whether there may be impacts to listed species. A determination of no effect may occur and terminate the process. If there is a determination of an effect, then the process goes to the third type of consultation.
- 3) **Formal Consultation** – Under this consultation NMFS and the USFWS must issue a biological opinion in which the listed species are either in or not in jeopardy from the project. If there is a determination of jeopardy, then there will be a series of requirements in order to obtain an Incidental Take Permit (take permit).

The Biological Evaluation (BE) concluded that the project will cause “no jeopardy” or “may affect, but is not likely to adversely affect” species that are listed under the ESA (Grette, 2005). It also found that critical habitat for ESA listed species will experience “no destruction or adverse modification.” Therefore, based on the findings in the BE, the project will be reviewed by the Service Agencies as an Informal Consultation.

### **NPDES Permit**

National Pollution Discharge Elimination System (NPDES) permits regulate the discharge of pollutants into the state’s surface waters. Ecology issues these permits under authority delegated by the U.S. Environmental Protection Agency (EPA). This permit is typically issued to a commercial or industrial facility, or municipality for discharge of any pollutant to surface waters. This remedial action will require discharge of treated wastewater into the South

Fork Skykomish River. Therefore, an Individual NPDES permit will be required for the project. In addition, other NPDES permits covered by the individual permit described above include a general stormwater construction permit and a general industrial stormwater permit.

General construction stormwater permits are required for all construction activities (including grading) on sites one acre or larger and when there is a discharge of stormwater to a surface water (e.g., wetlands, creeks, rivers, marine waters, ditches, estuaries) and/or storm drains that discharge to a surface water. Ecology issued the final general permit for 1- to 5-acre construction sites on November 16, 2005. The permit is subject to public notice and SEPA requirements must be met. The applicant must also complete a Stormwater Pollution Prevention Plan (SWPPP) prior to starting construction.

However, a general construction stormwater permit is not required for stormwater from any site that is covered under an NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

Similarly, for general industrial stormwater permits, any facility authorized to discharge stormwater under an existing NPDES individual or other general permit is excluded from the requirements of a general industrial stormwater permit. General industrial stormwater permits cover discharge of stormwater to a surface waterbody or to a municipal storm sewer system for existing and new facilities. Ecology can require permit coverage of any facility on a case-by-case basis in order to protect waters of the state.

An NPDES application was submitted by BNSF to Ecology on October 3, 2005, along with a Draft Engineering Report on July 20, 2005 and an Addendum to the Engineering Report on November 9, 2005. A letter was received from Ecology dated January 4, 2006 stating that the application is complete. As mentioned above, Ecology intends to issue one NPDES permit, which will contain conditions for the general construction and general industrial stormwater permits.

## **401 Water Certification**

Section 401 of the Clean Water Act specifies that water quality certifications are issued for projects that require Section 404 permits (described above), unless the Corps issues a Nationwide permit. The work is expected to be approved under a Nationwide 38 permit (Cleanup of Hazardous and Toxic Waste). By issuing a Nationwide 38 permit, the Corps is responsible for the water quality certificate and has a general set of criteria that applies. Ecology may impose additional site specific criteria required by Washington State, which may be added as an administrative order or other means.

If an individual Section 404 permit is required rather than a Nationwide 38 permit, issuance of a certification by Ecology means that Ecology anticipates that the applicant's project will comply with water quality standards and other aquatic resource protection requirements under Ecology's authority. The 401 Certification can cover both the construction and operation of the proposed project. Conditions of the 401 Certification become conditions of the Federal permit or license. Specific certification requirements may include a mixing zone with turbidity limits downstream from the Project Area, in addition to other criteria.

Ecology's Shoreline and Environmental Assistance Office within each regional office conducts the review of the 401 Water Certification application. Regional staff members review the applications for completeness and send out a letter or call if additional information is needed. Once the application is considered complete, the regional staff starts reviewing the project to recommend approval or denial. Modifications to plans submitted may be required. A site visit may also be required as part of the process.

401 Certification becomes part of the Federal permit or license. The duration of the 401 Certification would be in effect for the same time period as the permit or license, however Ecology issues 401 Certifications as 90.48 administrative orders, so they may have conditions that apply to the project longer than the Federal permit or license.

Individual 401 certification requires a minimum twenty days of public notice and may take up to one year to approve, condition, or deny. The process usually takes less than three months.

## **2.3.2 State Permits**

### **Hydraulic Project Approval**

Hydraulic Project Approval (HPA) is required from the State Department of Fish and Wildlife (DFW) for any work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state, except for cleanup projects conducted under MTCA by administrative order. As stated above, a HPA is not formally required because the cleanup is being performed under an order with Ecology; however, the project must meet the substantive requirements of the HPA.

A complete application package for an HPA must include a completed Joint Aquatic Resource Permit Application (JARPA) form, general plans for the overall project, and complete plans and specifications of the proposed work within the ordinary high water line in fresh waters of the state, complete plans and specifications for the protection of fish life, and notice of compliance with any applicable requirements of the State Environmental Policy Act (SEPA).

A determination of substantive requirements should be issued by DFW within 45 calendar days after the complete application is received. Processing of an application can be placed on hold if applicant cannot be reached, if project site is inaccessible, or the applicant requests it.

## **State Environmental Policy Act (SEPA)**

The Washington State Environmental Policy Act (SEPA) provides a way to identify and mitigate probable environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified.

For this project, Ecology is the lead agency responsible for issuing all SEPA determinations. The SEPA review process is a tool to help agencies identify and evaluate the likely environmental consequences of a proposal. The elements of the environment evaluated include the natural environment (earth, air, water, plants and animals, energy and natural resources) and the built environment (environmental health, land and shoreline use, transportation, public services and utilities).

The threshold determination process is the process used to evaluate the environmental consequences of a proposal and determine whether the proposal is likely to have any “significant adverse environmental impact.” This determination is made by the lead agency and is documented in either a determination of nonsignificance (DNS), or a determination of significance (DS) and subsequent preparation of an environmental impact statement (EIS). As described below, a DS has been issued for this site.

## **Environmental Impact Statement (EIS)**

Ecology issued a DS for the levee interim cleanup action in Skykomish in January 2006 stating that a focused EIS is required. An EIS has been prepared by Ecology. The document provides an impartial discussion of significant environmental impacts, reasonable alternatives, and mitigation measures that would avoid or minimize significant adverse impacts that the proposed levee interim action for cleanup is likely to have on the natural and built environment. The EIS was presented along with the Draft EDR and other documents needed for the cleanup work for formal public comment in March 2006. The final EIS was issued on April 27, 2006.

## **2.3.3 Town of Skykomish Permits**

### **Shoreline Development**

A Shoreline Substantial Development Permit is a written permit issued by local government for development on shorelines, as required under the state Shoreline Management Act. Many types of development are exempt from this permit requirement. After completion of the local process the permits are sent to Ecology for filing but Ecology does not have authority to approve or deny them when the permits are consistent with an existing shoreline management plan that has been previously approved by Ecology. Because this work is under a MTCA Order, no formal permit is required, but the substantive requirements of the Town's shoreline management plan must be met. The Town will also review the proposed work, determine whether the work complies with the substantive requirements of its shoreline program and regulations, and recommend mitigation measures to Ecology based on the Town's existing substantive requirements in its shoreline program. Ecology will determine whether the proposed work complies with the substantive requirements of the Town's shoreline program.

### **Land Use and Zoning**

Each local government has land use and zoning regulations that govern construction, excavation and demolition activities within its jurisdiction. Because this work will be subject to an agreed order with Ecology, no formal zoning or land use permits are required, but the substantive land use and zoning requirements of the Town of Skykomish must be met. The Town will also review the proposed work, determine whether the work complies with the substantive requirements of its land use and zoning ordinances, and recommend mitigation measures to Ecology based on the Town's existing substantive requirements in its land use and zoning ordinances. Ecology will determine whether the proposed work complies with the substantive requirements of these ordinances.

### **Floodplain Management**

Local governments participating in the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA) are required to review proposed development projects to determine if they are in identified floodplains as shown on the FEMA maps. If a project is located in a mapped 100-year floodplain (A or V zone), the local government must require that a permit be obtained prior to development. Again, because this work is under an agreed order with Ecology, no formal permit is required, but the substantive requirements of the permit must be met.

Proposed projects are reviewed and conditions imposed on any permits issued to reduce the potential for damage from floodwater. Permits are required for any development as well as for filling or grading activities in the floodplain.

Permit processing time varies by jurisdiction and project complexity. Though a public hearing is not normally required, there are exceptions. State law requires that local entities have a local floodplain ordinance that meets or exceeds NFIP requirements.

The Project Area lies within the 100-year floodplain based on the FEMA Flood Insurance Map for the Town (FEMA, 2001).

## **Critical Area Ordinance**

The Town of Skykomish developed the Critical Area Ordinance (CAO) to designate and classify environmentally sensitive and hazardous areas and to protect these areas and their values. Critical areas protected in the ordinance include wetlands, geologically hazardous areas, aquifer recharge areas, fish and wildlife habitats, and flood hazard areas. The ordinance limits development and alteration of the critical areas. The CAO is a requirement of local governments under the state Growth Management Act (GMA) to protect critical area lands. The Town will review the proposed work, determine whether it will adversely affect critical areas as outlined in the CAO, and recommend mitigation measures to Ecology based on the Town's existing substantive requirements in its CAO. Ecology will determine whether the proposed work complies with the substantive requirements of the CAO and other local land use and development standards.

## **Clearing and Grading**

Under the Town of Skykomish Ordinance Number 267, property owners need to obtain a Clearing and Grading Permit before doing any work in a drainage course, wetlands, environmentally sensitive areas, areas of special flood hazard, or archeological sites.

The backfill placed in the excavated areas will be compacted to a minimum density specified in the Uniform Building Code version most recently adopted by the Town. The Town will also review the proposed work and recommend mitigation measures to Ecology based on the Town's existing substantive requirements in Ord No. 267. Ecology will determine whether the proposed work complies with the substantive requirements of Ord. No. 267.

## **2.3.4 King County**

### **Special Use Permit**

King County owns the current flood control levee, although the Town owns the land underlying the levee. For the use of property in which King County has an ownership interest a Special Use Permit is required. The Special Use Permit is submitted in the form of a letter; there may be fees required for the processing, administration, land use, inspection, and plan review associated with the permit request. Additionally, there may be a requirement to add King

County as an additional insured party on the project insurance policy and/or bonding requirements to reduce King County exposure to liability and damage.

## **Sewer System Permitting**

Title 13 of the Code of the King County Board of Health, known as the “On-Site Sewage Code,” governs the design, construction, use, maintenance and repair of on-site sewage systems throughout King County. These systems are commonly known as septic tank systems. As part of the displacement of residences, existing septic systems will be demolished. Replacement of these septic systems will be performed after excavation is completed in conjunction with restoration of home sites. Septic system replacement must comply with the substantive requirements stipulated in an on-site sewer system construction permit. Since replacement of septic systems in fill material (i.e., backfill material used to fill excavations) is not typically allowed by Title 13, BNSF anticipates that an informational permit application will be rejected as not meeting substantive requirements. Based on meetings with the King County Health Department, BNSF would then submit an Application for Reconsideration of Decision/Order to the King County Sewage Review Committee. An application will need to be completed for each residence and signed by property owners. It is expected that King County will allow septic systems to be constructed in engineered fill on a temporary basis pending implementation of a community-wide septic management plan.

### **2.3.5 Native Sovereign Nations**

The Draft EIS scoping were circulated to the Tulalip, Stillaguamish, and Snoqualmie tribes in order to determine if any of these Tribes would be adversely affected. None of these tribes provided comments on the DS, Draft EIS scoping, Draft EIS, and draft EDR. NOAA-Fisheries and the USFWS also reportedly consulted with these tribes during the ESA process.

## 3 Design Criteria

The approval of the design criteria for the reconstructed levee and restored home sites and public rights-of-way will be three-fold:

- 1) The river face of the levee will meet with existing substantive standards for habitat and resource restoration of Ecology, the Town, DFW, NOAA-Fisheries, USFWS, and USACE
- 2) The levee interior will meet the existing substantive standards of King County, USACE, and the Town for flood control and public safety
- 3) The levee crest, back-slope, home sites and public rights-of-way will meet the existing substantive standards of the Town for land use, zoning and building codes.

The criteria are detailed below. The design of the levee itself is simplified by the fact that the existing levee will be replaced in-kind by using the current configuration as a guide during replacement. However, the new levee will include aquatic habitat features and improvements on the river face and recreational/aesthetic features and improvements on the crest and back-slope.

### 3.1 Design Requirements

This section outlines the codes, standards and guidelines applicable to the design of the new levee and the restoration of home sites and public rights-of-way.

#### 3.1.1 Codes

The Town of Skykomish Building Code is to be used and is found in Title 15 of the Skykomish Municipal Code adopted under Ordinance 360. This document is primarily for buildings, but details fences and other appurtenances may be relevant to the levee design. “Design Guidelines for Skykomish, WA,” sponsored by the Town of Skykomish Design Review Board, was written with a grant from the King County Landmarks and Heritage Commission 1995 King County Arts and Heritage Initiative, December 1996. These guidelines were adopted under Ordinances 259, 351, and 234 and should also be used.

The Standards for the Treatment of Historic Properties issued by the Secretary of the U.S. Department of the Interior are relevant and appropriate because 13 historic buildings and the Skykomish Bridge have been designated a cultural resource worthy of preservation by the National Register of Historic Places, and some of the residences subject to temporary relocation are designated historic buildings.

### **3.1.2 Standards and Guidelines**

Guidelines for levee design and/or restoration can be found in federal, state, and county publications. The publications to be consulted on this project are listed below.

Federal design guidelines for levees and for excavation shoring can be found in:

- **Design and Construction of Levees.** U.S. Army Corps of Engineers, Engineer Manual EM 1110-2-1913, 30 April 2000
- **Retaining and Flood Walls.** U.S. Army Corps of Engineers, Engineer Manual EM 1110-2-2502, 29 September 1989
- **Gravity Dam Design.** U.S. Army Corps of Engineers, Engineer Manual EM 1110-2-2200, 30 June 1995.

State design guidelines for levees and streambanks can be found in:

- **Integrated Streambank Protection Guidelines.** Washington State Aquatics Habitat Guidelines Program, 2003
- **California Bank and Shore Rock Slope Protection Design.** State of California Department of Transportation, Engineering Service Center, Final Report No. FHWA-CA-TL-95-10, Caltrans Study No. F90TL03, October 2000.

County design standards and guidelines for levees and roads can be found in:

- **Guidelines for Bank Stabilization Projects in the Riverine Environments of King County.** King County Department of Public Works, Surface Water Management Division, Seattle, Washington, June 1993.
- **King County Road Standards 1993.** King County Department of Transportation, Road Services Division, King County, Washington, 1993.

Other guidelines, plans and recommendations will be referenced as they are used or quoted.

## **3.2 South Fork Skykomish River**

The South Fork Skykomish River forms in the Cascade Mountains and flows westward. Near Monroe, it joins with the Snoqualmie River, becomes the Snohomish River and empties into Puget Sound at Everett.

### 3.2.1 River Levels during Construction Months

Anticipated river levels during construction were used to determine the cofferdam design and to assess the dewatering needs. Construction below the ordinary high water mark will be limited to the “fish window” from July 1<sup>st</sup> to August 31<sup>st</sup> but may be as late as September 15<sup>th</sup>, based on the final decision of the Department of Fish and Wildlife regarding fish window start and end dates. The maximum water level in the river during the fish window is needed to select the design height of the top of the cofferdam. The minimum water level is provided for reference.

An evaluation of river stage and discharge is included in Appendix C. River stages of the South Fork Skykomish River are measured by a sonic gauge on the 5<sup>th</sup> Street Bridge. Mean monthly stage statistics are available for the years 2000 through 2004, for a total of five years, as shown in Table 3-1. To determine whether these stages are representative of the typical range of river stages, the data were compared to the mean monthly discharges of the South Fork Skykomish River at Gold Bar, for which data was available for the years 1929 through 2004, for a total of 76 years. Based on the evaluation presented in Appendix C, the years 2001 and 2003 represent “dry” years fairly consistently (i.e., low river stage). The years 2000 and 2002 represent fairly “wet” years (i.e., high river stage) for June and July, and the years 2000 and 2004 represent “wet” years for August and September. To be conservative, the maximum stage statistics for the year 2000 will be used to guide design of the cofferdam height. If maximum stage statistics for the year 2000 are exceeded, the adequacy of the cofferdam height and procedures for construction will be evaluated to assess whether changes need to be made to proceed safely with construction.

**Table 3-1 Mean Monthly Stages of the South Fork of the Skykomish River at the 5<sup>th</sup> Street Bridge**

Year and Month	Minimum (ft)	Mean (ft)	Maximum (ft)
2000 June	5.8	6.6	8.2
2001 June	4.7	5.2	6.0
2002 June	5.9	7.2	8.7
2003 June	4.4	5.4	6.8
2004 June	4.4	5.4	6.4
2000 July	4.2	4.9	6.0
2001 July	3.6	4.1	4.9
2002 July	4.2	5.5	6.7
2003 July	3.2	4.0	4.8
2004 July	3.4	4.0	4.7

Year and Month	Minimum (ft)	Mean (ft)	Maximum (ft)
2000 August	3.2	3.8	4.4
2001 August	3.2	3.5	3.9
2002 August	3.3	3.9	4.6
2003 August	2.9	3.3	3.6
2004 August	3.2	3.8	5.9
2000 September	2.9	3.7	7.6
2001 September	2.7	3.2	3.5
2002 September	2.9	3.4	3.9
2003 September	2.7	3.2	3.8
2004 September	3.5	4.6	7.0

### 3.2.2 Flooding Events

The water stage at the 5<sup>th</sup> Street Bridge gage can be correlated with the flow in the South Fork Skykomish River at the levee by extrapolating flood study data. The flood study data (FEMA, 2001) include elevations and peak discharges for the 10-year, 50-year, 100-year, and 500-year flood levels. River peak discharge and flood stage are assumed to be directly related. Correlation of river elevation and peak discharge for three sections along the river in front of the levee are given in Table 3-2. Table 3-2 also shows the river stage at the gage on the bridge. Flooding in the South Fork Skykomish River typically occurs October through June, not during the anticipated construction period of July through September.

**Table 3-2 Flood Frequency Elevations and Discharges at the Town of Skykomish**

Location	Flood Frequency	Elevation, ft NGVD29*	Elevation, ft NAVD88	Peak Discharge, cfs	River Stage, Gage ft
At 5 <sup>th</sup> Street Bridge	1-yr**	921.9	926.0	20,500	11.8
	2-yr**	922.6	926.6	24,000	12.4
	5-yr**	923.5	927.6	30,000	13.4
	10-yr	924.1	928.2	32,200	14.0
	50-yr	925.7	929.8	47,400	15.6
	100-yr	926.3	930.4	54,300	16.2
320 Ft Downstream of Bridge	1-yr**	920.2	924.2	20,500	N/A
	2-yr**	921.0	925.0	24,000	N/A
	5-yr**	922.0	926.0	30,000	N/A
	10-yr	922.8	926.8	32,200	N/A
	50-yr	924.6	928.6	47,400	N/A
	100-yr	925.4	929.4	54,300	N/A

Location	Flood Frequency	Elevation, ft NGVD29*	Elevation, ft NAVD88	Peak Discharge, cfs	River Stage, Gage ft
650 Ft Downstream of Bridge	1-yr**	918.5	922.6	20,500	N/A
	2-yr**	919.5	923.6	24,000	N/A
	5-yr**	920.8	924.8	30,000	N/A
	10-yr	921.8	925.8	32,200	N/A
	50-yr	924.2	928.4	47,400	N/A
	100-yr	925.2	929.2	54,300	N/A

\* Per FEMA Flood Study, 2001.

\*\* Extrapolated, based on semi-log plot of 10-yr., 50-yr., and 100-yr. for elevations and log-log plot for discharges.

There is a possibility that the river will be at such a high stage at the anticipated start of construction that it will make construction impossible given the amount of work that needs to occur within the short fish window. Should the river stage be unseasonably high on June 1<sup>st</sup>, discussions with Ecology will be held to determine how best to complete the in-river work as outlined in Section 4.3 below.

### 3.2.3 Fish

Measures that are intended to reduce the potential for short-term effects on fish from in-water construction activities and long-term effects from habitat change will be incorporated into the design. These provisions include timing of construction and temporary exclusion from the work area to avoid direct effects to fish, implementation of construction best management practices (BMPs), and restoration of the area following construction.

The following conservation measures will be implemented in order to reduce the effects on fish during and following construction:

#### Fish Window

Work below the ordinary high-water mark must occur between July 1 and September 15. Other timing restrictions that may be established by the Corps, NOAA Fisheries, USFWS, or WDFW would also be strictly observed.

#### BMPs

- Project construction will be completed in compliance with Washington water quality standards (WAC 173-201a).
- Corrective actions will be taken in the event of any discharge of oil, fuel, or chemicals into the South Fork Skykomish River.
- Ecology has requested that tertiary containment be used to isolate the excavation and construction work from the river. A primary temporary river exclusion wall (cofferdam) will be placed waterward of the proposed excavated prism. The cofferdam will

be placed within the south portion of the river channel, and will prevent water from entering the construction site in the event of high flows. The wall will also exclude migrating fish from entering the construction area. A second cofferdam will be located just beyond the primary cofferdam to provide secondary containment to ensure that soil, sediment and organic contaminants are not released to the river. Tertiary containment will consist of oil absorbent booms placed outside of the second cofferdam. Since a construction water treatment plant will be available on site as part of the project facilities, there will also be provisions for pumping of water as necessary (and as treatment capacity allows) in the event contaminants are released beyond the primary cofferdam. Additional contingencies could also include the placement of sorbent material between the two cofferdams.

- Booms and silt screens may be used as contingencies adjacent to the excavation area to prevent any oily sheen or suspended sediments from reaching surface waters during construction. These materials will be listed in the Spill Prevention and Emergency Cleanup Plan.
- BNSF and its contractors will be required to capture any debris associated with project construction and not allow it to enter the South Fork Skykomish River.
- Any contact water will be treated through a treatment train, as discussed in Section 4.4 and in the NPDES permit application and associated documents. Treated water will then be pumped back into the river channel downstream of the excavation prism at the outfall of the NPDES-permitted water treatment system.

## **Restoration Activities**

- After completion of the excavation, sediment substrate of comparable type and gradation to existing materials will be replaced.
- Once the new levee is constructed, native vegetation will be replanted along the face. The newly planted vegetation will provide cover and foraging opportunities for migrating juvenile salmonids along the toe of the new levee. Additionally, the configuration of the toe of the levee will provide habitat complexity, which will include placement of large woody debris (LWD) and root wads. Large boulders will be placed upstream of the LWD for protection.

### **3.3 Shoring**

The excavation shoring design will be completed by the contractor to federal and state standards and will be stamped by a contractor-selected licensed Washington state professional engineer prior to excavation. The shoring will consist of driven sheet piles with lagging or an alternate approved by the engineer.

The general concept of shoring is that it will be installed along the southern end of the excavation to facilitate continuation of the remedy to the south in future phases of the work. Shoring is also intended to be used on a contingency measure if excavation depths deeper than that shown on the plans cannot be accommodated by sloping.

### **3.4 Cofferdam**

Five design options were analyzed for the cofferdam construction:

- Curtain
- Bladder
- Block/jersey barriers
- Flexible intermediate bulk containers
- Elongated bags.

The curtain cofferdam is an impervious fabric membrane supported by a free standing, welded, tubular steel framework support system (see <http://www.portadam.com>). The literature claims that this system can retain water up to 100 percent of its height up to 12 feet.

The bladder cofferdam is a water-inflated tube (see <http://www.aqua-barrier.com> or <http://www.wippsystem.com>) that can be inflated up to a height of 8 feet. However, this type of structure is only capable of retaining water heights that are 75 percent of the tube height (i.e. an 8-foot high tube can retain a maximum of 6 feet of water).

The curtain and bladder are proprietary, temporary cofferdam designs with limited height. There are also instability issues for the bladder design should the river overtop the cofferdam during a freshet. These options are not recommended for use on the levee remediation project

Plastic jersey barriers filled with sand or water, and lock-blocks were also considered for the cofferdam. The jersey barriers are limited to a height of 4 feet, may be unstable if overtopped, and required inter-barrier gaps to be plugged. The lock-block wall is stable (see <http://www.ultrablock.com>) even when overtopped and is not height limited, but takes a relatively long time to assemble when compared to the other options.

Based on their past performance being used in cofferdam construction, the recommended options for this project are the flexible intermediate bulk containers (FIBC) and the elongated bags. Both of the FIBC cofferdams (see <http://www.fibca.com>) could be filled before July 1<sup>st</sup> with uncontaminated clean overburden excavated from the levee and placed in the river to divert the water around the excavation area. An impermeable liner will be wrapped around the cofferdams, as shown on Figure C-15. The liner will be below the cofferdams and on both the inside of the inner cofferdam and the outside of the outer cofferdam. Valuable construction time would be saved with the FIBCs filled and ready to be placed when the fish-window opens. Sand bags will be used to tie the cofferdams to the shore in order to prevent leakage or a breach. BNSF is continuing to evaluate options for placement of FIBCs on a level surface on the riverbed and limiting flows under the cofferdams.

Elongated bags, in particular the WALL<sup>™</sup> by Hydrolevee, are trapezoidal bags made of polypropylene fabric with impermeable end skirts and impermeable liners. The bags, when filled, can be up to 12 feet x 10 feet x 2 feet x 26 feet (base width x height x top width x length). They would be placed using a mechanical frame from shore. Since the WALL<sup>™</sup> has an impermeable liner, one does not need to be wrapped around the coffer dams.

### **3.5 Excavation**

It is currently anticipated that the existing levee will be removed and excavated to the ground elevations indicated on Figures C-13 and C-14. Work will proceed from upstream to downstream. The excavation prism shown in these drawings is based on soil and sediment investigations conducted in the project area in September and December 2005. The objective of the investigation was to provide adequate data to define the lateral and vertical extent of excavation. Appendix B presents a report with the methodology and results of the investigation. This excavation prism was defined based on the borings along the levee and in the river, as well as previous data collected during remedial investigations at the site. Analytical data from the borings completed in the levee and in the river are provided in Appendix B. The technical memorandum also presents the data analysis that was used to define the excavation prism. The anticipated vertical extent of the excavation is based on the depth at which soil/sediment analytical results indicate TPH concentrations are below the remediation level of 3,400 ppm NWTPH-Dx for soil or the cleanup level of 40.9 ppm NWTPH-Dx for sediments.

Once the planned limits of excavation are achieved, samples will be taken to determine if the applicable remediation or cleanup level has been achieved. Excavations waterward of the OHWM will meet the sediment cleanup level of 40.9 ppm NWTPH-Dx or extend 10 feet below the bottom of the river, whichever is shallower. The uplands excavation 25 feet landward of the OHWM, must be as deep as the sediment excavation in elevation or meet the

soil cleanup level of 22 ppm or the Practical Quantitation Limit as outlined in the Sampling and Analysis Plan (SAP [Appendix G]).

The anticipated maximum depth of the excavation is 19.5 feet bgs or an elevation of 905 feet (NAVD88). Contingencies are described below to allow for deeper excavation in isolated areas to elevation 895 feet (NAVD88) based on confirmation sampling results.

### **3.5.1 Excavation Prism**

A “maximum extent excavation prism” was shown in engineering design drawings submitted with the JARPA on January 11, 2006 and calls for excavation to depths as great as elevation 895 feet (NAVD88). The anticipated excavation prism shown in Figures C-13 and C-14 is based largely on the December 2005 levee investigation results. The actual extent of excavation may increase beyond that shown in the JARPA or Figures C-13 and C-14 during construction based on: 1) on-site visual inspection, 2) confirmation (post-dredge) sampling analytical results, and 3) surface water inspection. Ecology will be present to make in-field decisions re: the extent of excavation.

#### **Lateral and Vertical Extent of the Levee and River Excavation Prism**

The eastern edge of the excavation prism at boring location LEV-9 will be extended as close as practical to the 5<sup>th</sup> Street Bridge (within the structural constraints of the bridge, or 40 feet west of the bridge) and the same depth as that of LEV-8 (approximately 910 feet NAVD88). It is anticipated that the eastern end of the excavation can be accommodated in a stable manner using slopes that are 2H:1V above the anticipated depth of groundwater, and 4H:1V below the water table. Driven sheet piles will be used if required by the excavation depth encountered in the field at the time of removal. This shoring design will be approved prior to the start of excavation.

The western extent of the excavation prism at boring location LEV-1 will extend to a depth of 907 feet NAVD88. However, an additional boring may be advanced west of LEV-1 in January 2006 that may impact the final design. The excavation depth at LEV-2, LEV-3 and LEV-4 will be 910, 910 and 905 feet NAVD88, respectively. As stated above, all excavation “extents” will also be subject to laboratory confirmation that the appropriate standards have been met. Field conditions may dictate the maximum extents of excavation as described below in Section 3.5.3.

#### **Lateral and Vertical Extent in the Upland Portion**

The lateral extent of the upland excavation needs to be sufficient to allow for a reasonable work zone. This work zone will include removal or demolition of five residences to provide adequate space.

Vertical excavation will need to be sufficient to meet the direct contact cleanup level (3,400 ppm TPH NWTPH-Dx, or the remediation level) in soil a minimum of 15 feet bgs, as well as meet the groundwater remediation levels. This may require excavation to elevation 908 NAVD88 where there is a significant subsurface silt layer present beneath residences located on the south side of West River Road near 5<sup>th</sup> and 6<sup>th</sup> Streets. Sediments will have to meet the sediment cleanup level of 40.9 ppm TPH NWTPH-Dx.

### **3.5.2 Excavation Dewatering**

It is anticipated that the bulk of the excavation will be completed under wet conditions or “in the wet,” depending on the river level and excavation depth using a combination of excavator and drag line technologies. It is anticipated that some pumping of water from the excavation will be required to create a gradient toward the excavation pit, and away from the river or surface water. A nominal 500 gpm (maximum 1,000 gpm) treatment system is currently being permitted to handle dewatering and other water generated during construction. Calculations predicting the water inflow are in Appendix E. All saturated material removed from the excavation pits must be dewatered prior to final transport. Saturated soils and sediment removed from the excavation can be placed on top of the ground surface (designated for excavation) at the edge of the excavation to allow water to drain back into the excavation prior to transport to a contained stockpile area on the railyard. All water from the contaminated stockpiles must be controlled and collected within a containment area and transferred into the NPDES-permitted treatment system. Trucks will be lined as necessary with watertight material to prevent spillage both before and after dewatering has occurred, as material will still be moist. Any accidental spillage will be identified and immediately remedied. Additional details will be presented in the Dewatering Plan (part of the Technical Execution Plan from the contractor).

### **3.5.3 Contingencies**

Increased side-sloping, shoring or other methods will be used in limited areas if it is determined that excavation below those shown on the drawings is required based on visual inspection and/or soil/dredge confirmation results. Provisions will be available on the site at the time of soil removal to facilitate soil excavation down to elevation 895 feet NAVD 88 in limited areas. A combination of locally increased side slopes (still maintaining side slope stability) and driven/trenched sheet pile shoring will be used as conditions warrant.

Another contingency measure that will be considered in the event excavation can not safely be completed to the required depths within the fish window time constraints is that of soil mixing. Soil could be mixed in place to release sediment-affixed contaminants into the water for removal and treatment (via the NPDES-permitted treatment system) below the excavation depth achieved via conventional excavation/shoring/dredging, down to the maximum required

depth to remove documented contaminants to the concentrations required. This is considered a “last resort” option and will be approved by Ecology only in the event that other techniques fail to provide adequate resolution. The contaminants released into the water column would be removed by a skimming or vacuum process for treatment.

A spill plan will be developed by the on-call spill response contractor that will address contingencies to be implemented in the event of a breach of the cofferdams and downstream escape of contamination.

### **3.6 Upland Source Control**

Measures to control upland sources that will remain following the levee cleanup have been evaluated for the inclusion in the final design. Options considered included installation of a recovery trench along the southern boundary of the excavation, installation of sheet piles to form a physical barrier, or use of any shoring used along the southern excavation face in a funnel-and-gate array to control lateral flow and allow directed recovery of contaminants pending upland remediation. A sheet pile barrier along the southern excavation face will be used to control the upland sources and to minimize the potential for re-contamination of newly placed fill. Based on groundwater flow modeling performed during the design of the barrier wall and fluid level gauging behind the barrier wall, less than 1 foot of groundwater mounding is expected behind the sheet pile wall. The sheet pile wall will not be impermeable (the joints will not be sealed) and any mounding impacts will be temporary.

### **3.7 Construction Water Treatment**

Construction water treatment will be needed during construction for the water that is pumped from the excavation. The treatment system will be located in a lined facility to handle any minor leaks. This water will be treated according to the processes outlined in the Draft Water Treatment Engineering Report (RETEC, 2005b). The nominal capacity of the treatment is 500 gpm, with a maximum flow of 1,000 gpm in accordance with the NPDES permit issued for the project. Decontamination water generated from decontamination procedures will not be treated on-site. Decontamination water will be stored on-site and taken to an off-site licensed facility for disposal or treatment.

### **3.8 Levee Design Sections**

Several levee design criteria result from replacement in-kind or have been developed from the site conditions and remedial criteria previously described. These include:

- **Levee crest elevation** – minimum 930 feet (NAVD88)
- **Levee face slope** – minimum 2 horizontal to 1 vertical

- **Levee embankment material and gradation** – sandy gravel
- **Levee protection material and gradation** – armor rock with median diameter at least 18 inches, or withstand a 100-year peak river flow of 11 fps
- **Levee face plantings** – 100 percent vegetation cover above ordinary high water mark (OHWM) within three years
- **Habitat mitigation or enhancement features** – large woody debris and rock stilling ponds or curvilinear groins.

The plan is to recycle as much of the uncontaminated existing levee material as practicable, including the facing armor rock.

### **3.8.1 Levee Materials**

The materials used for the levee construction will consist of: (1) excavated clean overburden, (2) clean armor rock rocks, (3) imported backfill for levee and river fill material, and (4) soil for plantings. Armor rock will be washed with high pressure water if contaminated. Water resulting from the steam cleaning will be collected and treated at the NPDES-permitted treatment facility prior to discharge. If the rock is unable to be cleaned, it will be shipped to a Subtitle-D landfill with the rest of the contaminated soil and sediment for disposal. Imported material will be similar to the existing levee and river material as described in the boring logs in Appendix B.

## **3.9 Embankment Slope Protection**

Embankment stabilization/slope protection will be accomplished through the use of both armor rock and vegetation. The current face of the levee appears to be stable with the facing of 12 inch nominal armor rocks. The rocks have acquired a green moss covering. Trees, shrubs and grass have taken root on the armor rock face.

### **3.9.1 Armor Rock**

The rock size and weight affects the ability of the armor rock to resist the river flow. The armor rock will be designed to resist the maximum river flow velocities. The 100-year average flood velocity at the levee site is 11 feet per second (fps) according to the recent FEMA (2001) flood study results. According to the USACE Engineering Manual-Hydraulic Design of Flood Control Measures (1994), the rock size is calculated based on the estimated river velocities and a minimum factor of safety of 1.1. The rock size calculations are provided in Appendix D. Based on these calculations, the armor rock/armor rock layer will be increased in thickness from the existing 2 feet to a minimum of 3 feet and the median size will be increased from median size of 12 inches in diameter to a median size of at least 18 inches in

diameter. The imported rock will be graded such that  $D_{30} \geq 21$  inches,  $D_{50} \geq 28$  inches,  $D_{90} \geq 40$  inches. This rock will be mixed with the existing recycled armor rock to achieve a median of 18 inches. The increase in layer thickness will also offset the destabilizing potential of plant roots dislodging stones if and when they fall down or are uprooted by flood currents while an increased rock size will provide a more stable shell under flood conditions. If plant roots or flood currents dislodge armor rock stones, it will be necessary for King County to assess the damage and possibly provide emergency repair. Emergency repair is anticipated to include some form of dumped rock during or immediately after the flood event.

### **3.9.2 Armor Rock Characteristics**

#### **Rock Shape Requirements**

The rock used for armor rock shall have sharp, angular, clean edges at the intersections of relatively flat faces and meet the following criteria:

- The rock shall be predominantly angular in shape
- Not more than 30 percent of the rocks distributed throughout the gradation should have a ratio of a/c (the rock dimensions of 'a' and 'c' are perpendicular to each other and defined as the long and short axes of a rock, respectively) greater than 2.5
- Not more than 15 percent of the rocks distributed throughout the gradation should have a ratio of a/c greater than 3.0
- No rocks should have a ratio of a/c greater than 3.5.

#### **Rock Size and Weight**

The USACE Engineering Manual specifies that a minimum factor of safety of 1.1 and an estimated 100-year flood river velocity should be used in calculating the size of rock to be used for the armor rock. However, the factor of safety should be increased if the following conditions are considered:

- **Impact from River Floating Objects:** Impact forces on the armor rock resulting from logs, uprooted trees, ice, vessels and other types of large floating objects. Based on the observations conducted at the site, large trees and logs have been found resting on the armor rock after the high river stage.
- **Rock Size Calculations:** An increased factor of safety should be applied to compensate for inaccuracies in estimating the parameters in determining the rock size using the equation described above. This compensation should be used to the extent that the accuracy of the rock size is not compromised. Due to the

various degree of sensitivity of the parameters in the equation, the value of each parameter should be carefully selected to determine the rock size and minimize the need to increase the factor of safety.

- **Vandalism/Theft:** Vandalism and/or theft of the rock armor rock will affect the integrity of the slope protection. This tends to occur in urban areas. The weight of the rock will help prevent theft and vandalism.
- **Quality Control:** Undersized rocks can be eliminated or minimized by effective quality control to ensure the rocks delivered meet gradation requirements. Prior to placement of the armor rock, the rocks may require stockpiling and additional handling, which could potentially result in undersized rocks due to breakage. A screening process will be established to ensure no undersized rocks be used for the armor rock construction. Armor rock will be a mixture of existing recycled rock of 6- to 18-inch rock, with a median size of about 12 inches, and imported rock of 21- to 42-inch rock, with a median size of 28 inches. The final mixture should have a rock range from 6 to 42 inches, with a median rock size of at least 18 inches.
- **Freeze and Thaw:** Higher factor of safety should be used in severe freeze-thaw conditions. The climate in Skykomish is relatively mild and average low temperatures only fall slightly below freezing point during approximately two months per year. Freeze-thaw should not pose a concern at the site.

Based on the above discussion, the conditions that could affect the factor of safety including impact by floating objects and rock size equation parameters, a factor of safety of 1.3 was selected.

### **3.9.3 Armor Rock Top and End Protection**

The proposed armor rock will be installed on the entire length of the riverside slope of the embankment, as shown on Figure C-19. Vertically, the armor rock will extend from below the river scour depth to above the 100-year flood level. The lateral alignment of the revetment will be extended on the upstream and downstream ends to non-eroding velocities and relatively stable banks. A smooth transition from the end of the revetment to the end protection zones will be provided. See EM 1110-2-1601, Plate 41 for end protection design.

### **3.9.4 Armor Rock Toe Protection**

Revetment toe scour depth is estimated using the design charts (Plate 42). The toe protection will be provided by installing armor rock rocks to the estimated maximum scour depth, as shown on Figure C-19. The rocks will be

installed before the removal of the cofferdam. At the toe of the embankment, the armor rock will extend into the riverbed as show on Figure C-19.

### **3.9.5 Delivery and Placement**

Delivery and placement of the armor rocks must meet the following requirements:

- Machine placing will be used as the primary placement method of the armor rock. Hand placing will be used as secondary method to assist the machine placement to ensure the long axes of the rocks are oriented perpendicular to the bank.
- When using machine placement, only small increments of rocks should be placed to the final positions to avoid additional handling of the rocks. Any additional handling required due to the large quantity of armor rock being placed on the side slope can result in segregation and/or breakage of the rocks.
- To avoid breakage, rocks should not be dropped from an excessive height or dumped from the top of the levee.
- After the armor rock has been placed, a layer of soil will be added over the rock and worked into the interstices hydraulically (by spray hosing the soil into the spaces between the rocks). This allows control over the final thickness of the soil on top.

### **3.9.6 Quality Control**

Specific requirements for sampling and testing of the rock size and gradation were described in the bidding specification documents. Provisions will be established for the loading, transporting, stockpiling, and placing the armor rock materials. Inspections and observations by qualified personnel will be completed during the placement of the armor rock to demonstrate that the armor rock meets specifications.

## **3.10 Cleanup Standards**

The design criteria include cleanup/remediation levels and construction performance standards. Approval of the design criteria for the river face of the levee will be determined by Ecology, USACE, and USF&W. RETEC will approve the design criteria of the interior of the levee and the Town of Skykomish will review and comment on the levee crest and back slope design.

Cleanup levels under MTCA are defined as the concentrations of hazardous substances that are protective of human health and the environment under exposure conditions. Site-specific cleanup levels (CULs) and remediation levels (RLs) were developed by Ecology and are presented in the FS (RETEC,

2005a). Total petroleum hydrocarbons (TPH) by both NWTPH-Dx and VPH/EPH analytical methods are driving the cleanup of the site. However, cleanup levels have also been developed for associated carcinogenic and non-carcinogenic polynuclear aromatic hydrocarbons (PAHs), and PCBs, lead and arsenic. TPH was used as the surrogate for the PAHs in developing cleanup levels for some media and exposure pathways including soil direct contact and sediment protective of benthic organisms. TPH will therefore be the surrogate compound during the interim action for cleanup of the levee zone. PAH concentrations are not expected to exceed the applicable cleanup levels in soil containing NWTPH-Dx concentrations meeting the remediation level of 3,400 mg/kg.

The levee zone interim action for cleanup is intended to protect benthic and aquatic receptors in the river, the quality of water in the river, as well as humans who may come into contact with surface and subsurface soils, the levee and adjacent water through recreational activities. The objective of this cleanup action is to eliminate product seeps into the river, remove the contaminated sediment impacting aquatic receptors, and prevent dissolved petroleum in the groundwater from contaminating surface water and sediment. To achieve these goals, the groundwater flowing into the river must meet a cleanup level of 208 µg/L NWTPH-Dx and VPH/EPH.

Remediation levels may be used at sites where a combination of interim actions for cleanup are used to achieve cleanup levels at the point of compliance. Remediation levels are not the same as cleanup levels. Remediation levels under MTCA are defined as a concentration (or other method of identification) of a hazardous substance in soil, water, air, or sediment above which a particular cleanup action component will be required as part of a cleanup action at a site. Cleanup levels under MTCA are concentrations of a hazardous substance in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions. Remediation and cleanup levels are summarized in Table 2-1.

### **3.10.1 Soil**

Soil within the Project Area will be removed to address free product and to remove soil with concentrations above 3,400 mg/kg NWTPH-Dx. Soil 25 feet landward of the OHWM will be removed up to a depth of 10 feet if concentrations exceed the soil cleanup level of 22 mg/kg NWTPH-Dx. This 25 foot wide and 10 foot deep buffer area is to prevent recontamination of the sediments. Excavation to this remediation level will remove soil with the potential to impact groundwater to above the cleanup level, and will also be protective against recontamination of sediments when combined with the uplands cleanup. Excavated soil with concentrations exceeding 3,400 mg/kg NWTPH-Dx will be transported off-site to a licensed commercial landfill for disposal or reuse as daily cover as detailed in Section 4.

### **3.10.2 Groundwater**

The cleanup level for groundwater is 208 µg/L for NWTPH-Dx and VPH/EPH (whichever is more conservative), which will protect sediment and surface water where groundwater discharges to the river.

An air sparging system may be installed in the levee to address remaining dissolved phase groundwater impacts by enhanced biodegradation. This system would include vertical wells to inject the air and associated piping and blowers. This system is considered a contingency. BNSF's calculations in the FS indicate that groundwater will meet the cleanup level of 208 µg/L where groundwater discharges to surface water. A decision will be made prior to completion of the final design whether or not to include subsurface infrastructure such as wells or piping for a potential future air sparging system. The operation of an air sparging system would be part of the site-wide cleanup action and is beyond the scope of this interim action for cleanup.

### **3.10.3 Sediments**

The anticipated excavation area encompasses the area identified in the FS as requiring surface sediment removal based on bioassay testing. The area is estimated to be 440 feet long and 20 feet wide, and will include subsurface sediments. Sediment within the Project Area will be removed to the cleanup level of 40.9 mg/kg NWTPH-Dx.

### **3.10.4 Surface Water**

As with the groundwater, the cleanup level for surface water is 208 µg/L for NWTPH-Dx and VPH/EPH.

## **3.11 Community Amenities**

The Town of Skykomish led a visioning project to identify and describe a Vision for the future of Skykomish (Berryman & Henigar & University of Washington, August 2005). As part of the Vision, the Town passed Resolution No. 212 on July 11, 2005 to make recommendations for the levee design. Resolution No. 213 was passed on September 12, 2005, and replaced Resolution No. 212 with recommendations for the levee design. The overall vision for the levee is to create a “park-like area that affords views and access to the river.” Most of the recommendations included in Resolution No. 213 are associated with landscaping and river access to achieve their park-like vision for the levee. BNSF and the Town are currently negotiating the conditions under which BNSF would pay to incorporate some or all of the concepts articulated in Resolution No. 213 as part of BNSF's individual settlement agreements. The following nine elements were recommended by the Town for inclusion in the final design of the levee:

- Multi-disciplinary design team of both engineers and landscape architects.
- West River Road from 6<sup>th</sup> Street to the end of the school grounds will be closed during construction. A right of way west of the school grounds will be opened temporarily to provide access to residences at the south end of W. River Road.
- Direct water access should be provided at 5<sup>th</sup> Street, just west of the bridge to facilitate hand launching of boats and kayaks, as well as fishing and nature viewing.
- A trail should be provided along the length of the top of the levee for foot travel, extending from the end of the levee just west of the school grounds, and culminating at the river access area at the eastern tip of the levee near the 5<sup>th</sup> Street Bridge.
- Access to the levee trail should be provided at a minimum of three points – at the west end of the levee just beyond the school property, at the north of 6<sup>th</sup> Ave., and at the eastern end of the levee adjacent to the bridge. The trail access from the end of 6<sup>th</sup> Ave. should include a ramp meeting ADA accessibility standards.
- A landscape buffer consisting of small shrubs and grasses (to enable unobstructed views) should be planted along the edges of the levee trail. Trees should be planted to selectively enhance landscaping while maintaining view corridors.
- Seating should be provided at occasional points along the levee trail.
- An outlook should be created along the levee trail, at the 6<sup>th</sup> Street intersection.
- W. River Road should be maintained between 5<sup>th</sup> and 6<sup>th</sup> Streets and widened to at least 20 feet. A retaining wall should be used from the eastern edge of the levee to the point where West River Road narrows, to accommodate the widening of the road.

The Town has made other levee design recommendations through their participation in levee design meetings.

- Levee Infrastructure – the Mayor of Skykomish provided an e-mail dated October 20, 2005 from the Town of Skykomish Planning Commission that requests that consideration of the Town's need for infrastructure be included in the construction plan for the levee. Specifically, the Town requests that underground hand holes and

conduits (with three to four inner ducts and pulling lines pre-installed) be installed. Hand holes are requested at each end of the levee and at any location where present or future access (viewing platform, boat launch, etc.) would be needed. The inner ducts would be used for communications, power, or security as needed. Power for street lights, outdoor electrical outlets, holiday lighting, etc. could be installed in one inner duct and fiber optic cable in the second, which would leave one or two ducts available for future access. The Town also requests placement of all aerial utility and communications (telephone, power and cable TV) cables to underground ducts along Railroad Ave. and any other roads that are affected by future cleanup activities. This request includes the phone and power lines crossing the railyard east of the library. Finally, the Town requests that a sprinkler system be installed to facilitate maintenance of the newly planted vegetation and habitat restoration.

- **Levee Aesthetics** – The Town has requested that handrails installed at the top of the retaining wall be a dark green color, however, they desire the railings to be low maintenance (i.e., painting not required). Thus a baked on coating or the like should be used. The Town is also interested in coloring the concrete retaining wall (the concrete itself, not a stain applied on the surface to minimize maintenance) and also in having a decorative relief pattern molded on the outer surface of the retaining wall (leaves, fish or similar).

The Town's recommendations will be used as a guide for the design of the levee, and incorporated into the design where technically possible. Specific elements of the Town's recommendations that are not expressly required to meet substantive requirements, standards or regulations, and that are deemed to be more expensive than restoration to current conditions, are currently considered optional by BNSF, and identified as such in the design drawings and throughout this report. BNSF and the Town are currently negotiating the conditions under which BNSF would pay to incorporate some or all of the Town's requests and recommendations as part of BNSF's settlement agreement with the Town.

### **3.12 Construction Safety**

The primary safety concern is the traffic flow on West River Road and 6<sup>th</sup> Street during construction. West River Road will be included as part of the remediation area; therefore, the entire road will not be accessible by the general public, including emergency vehicles. Temporary access roads for the residents living west of the school on West River Road will be required. BNSF will coordinate with the community for temporary access roads to those residential areas. The school entrance and some residential houses are located

on 6<sup>th</sup> Street. The street will be used as an access and haul road but will remain open throughout the construction.

At least one lane of travel shall be provided along all the streets (except West River Road) within the Town limits throughout the construction period. Signage related to the project will be that typical of a road construction project with traffic controls and authorized personnel access. A traffic plan has been prepared for review by all affected agencies and persons including fire department, police department (county and state), residents and the school and is included as Figure C-11. Additionally, the contractor will prepare a Traffic Plan as part of the Technical Execution Plan.

In addition to the contractor personnel, at least one RETEC or BNSF project supervisor representative will be on-site at all times when field work is in progress. This field representative or supervisor may be the site health and safety officer, and will endeavor to restrict access to the active work zone by any unauthorized personnel.

Air quality monitoring will be done for the duration of this remedial action to ensure the safety of both the on-site contractor personnel and the public. This monitoring will be done in accordance with the air monitoring plan that will be developed.

### **3.13 Survey Control**

Existing Site information and construction of the levee remediation are based on survey control markers in the area and on recent topographic surveys of the levee and hydrographic surveys of the river. There are three control markers (monument and bench mark) near the site. The marker IDs and locations are shown on Figure C-3.

The National Geodetic Survey (NGS) marker is in the park next to the railroad tracks in the center of the Town of Skykomish. A description and coordinates (latitude, longitude, and elevation) of the marker are given on the Data Sheet for “Z58 1934 931.438” available at internet website [http://www.ngs.noaa.gov/cgi-bin/ds\\_mm.prl](http://www.ngs.noaa.gov/cgi-bin/ds_mm.prl). Information on this marker is also available on a Washington State Department of Transportation (WSDOT) Survey Mark Report available at the Internet website <http://www.wsdot.wa.gov/Monument/report.cfm?monumentid=2762>.

There is a discrepancy in the elevation given by the two reports. The NGS Data Sheet reports an elevation of 285.164 meters or 935.58 feet relative to the North American Vertical Datum of 1988 (NAVD88), whereas the WSDOT Survey Mark Report gives an elevation of 285.140 meters (NAVD88), which is an elevation of 935.50 feet using U.S. Survey Feet. The resolution of the discrepancy is discussed below.

WSDOT has a marker next to Highway Route 2 about 2,500 feet downstream of the bridge. A description and coordinates (latitude, longitude, and elevation) of the marker “2761” are given on WSDOT Survey Marker Report available at internet website <http://www.wsdot.wa.gov/Monument/report.cfm?monumentid=2761>.

King County has a marker in the sidewalk between the bridge and Town. Information for marker “GPS 8823 1995” is available from King County.

Resolution of the survey marker discrepancies and verification of the marker coordinates was done by using the King County marker “GPS 8823 1995” as the primary reference mark. Survey traverses were run to the NGS marker “Z58 1934 931.438” and the WSDOT marker “2761.” Washington State Plane coordinates per North American Datum of 1983/1991 and elevations per NAVD88 were corrected. The results are reported in the table on Figure C-3. These markers, with the corrected coordinates, will be used as survey control for the levee remediation.

### **3.14 EDR Amendment Protocol**

Should Ecology or BNSF determine that this EDR needs to be amended due to field conditions following Ecology approval of this document, the EDR Amendment Form (Appendix F) will be used. This form requires Ecology approval of any modifications to this EDR or the SAP (Appendix G). Other stakeholders involved in the interim action for cleanup of the levee zone must go through Ecology in order to amend the EDR or SAP.

## **4 Scope of Work**

### **4.1 Approach**

The design process involves identification and pre-qualification of up to five contractors that have the ability to do the levee remediation and provide input on the final design. BNSF issued a Request for Proposals (RFP) based on the design drawings that were included in the Draft EDR. Responses to RFP will be evaluated and a contractor will be selected to become part of the design team. In addition to the main contractor, a contractor specializing in house moving will also be selected. RETEC will continue to lead the design process and coordination between Ecology and BNSF.

#### **4.1.1 Solicitation Package**

A solicitation package consisting of detailed plans and specifications for prospective BNSF contractors was prepared to accompany the Draft EDR. In most respects, the solicitation package was a summary of the Draft EDR; however, it differed from the content of the Draft EDR in that it focused on the work that the contractor will be expected to accomplish during the construction period.

#### **4.1.2 Drawings**

Drawings were prepared in an iterative process. The permit drawings, considered as conceptual (30%) drawings, were completed and submitted by BNSF with the permit applications. As the Town of Skykomish and the agencies voiced opinions and concerns, the drawings have been modified and additions made to result in the drawings that accompany this report.

### **4.2 Permits**

As outlined in Section 2.3, this work is exempt from the procedural requirements of state and local permits. Substantive requirements for all state and local permits will be met and federal permit applications will be completed as required.

### **4.3 Weather Related Contingency Plan**

Prior to mobilization of equipment to the site, river levels, precipitation levels, weather forecasts and snow melt predictions need to be carefully evaluated. Sections 3.2.1 and 3.2.2 describe historic river levels and trends and also define a river level at or above which project implementation is not possible. If river levels are unseasonably high on June 1, 2006, there are unusually wet weather conditions, large snow melt, or similar unusual weather conditions, discussions between BNSF and Ecology will be held to determine what contingencies, such as a delayed start date or modification of project scope

would be appropriate. These contingencies could require an amendment to the Agreed Order.

## **4.4 Mobilization and Site Preparation**

Mobilization and site preparation will consist of bringing equipment and materials to the site and preparing the Project Area for the remedial action as described below.

### **4.4.1 Utility Locate**

Prior to commencing any on-site activities, all underground public and private lines will be located and marked with paint. Figures C-4 and C-5 show the approximate locations of all known utility lines on the site.

### **4.4.2 Clearing and Grubbing**

Clearing and grubbing of the vegetation (including brush and trees) and debris along the existing levee will be done to facilitate remediation activities. If reasonable within the time frame, access will be allowed to the Town so that they can remove a few trees for replanting by the Town outside of the project boundary. Other vegetation and debris will be disposed of at an appropriate municipal landfill.

### **4.4.3 Temporary Relocation of Structures**

The levee zone interim action for cleanup involves temporary relocation of five buildings:

- The Teacherage on School property
- The Mackner residence on West River Drive
- The Moore residence on 6<sup>th</sup> Street
- The two Mitchell residences on the corner of West River Drive and 5<sup>th</sup> Street.

Prior to relocation of buildings, utilities will be disconnected. This work is typically limited to the confines of the crawl space of the home. The existing sewer, water, gas, and heat ducts will be removed prior to the installation of rigging gear. The buildings will be temporarily relocated within Town during the levee cleanup implementation. It will not be possible for residents to inhabit the structures while they are displaced – the buildings will remain vacant. Any existing foundations, garages, porches, out-buildings, side walks, patios, driveways and landscaping will be cleared and materials disposed of appropriately. BNSF will provide alternative housing and moving expenses pursuant to access agreements with each property owner. Each house will be restored to its original location at the end of the project unless the owner elects

to have BNSF demolish the structure so that the owner can build a new structure consistent with the Town's current zoning, shoreline development, building codes and SEPA ordinance. Building new houses is not part of the proposed action. Any outbuildings demolished because it is unfeasible to move them will be replaced as part of the proposed action.

The process by which buildings are typically moved involves jacking the structure onto large beams that span the length of the structure. The buildings would then be moved in their entirety to an appropriate area somewhere in Town. However, the building would remain on the beams throughout the levee cleanup in anticipation of their restoration to their original locations, orientations, etc. It will not be possible for residents to inhabit the structures while they are displaced – the buildings will remain vacant. To mitigate against potential damage to the historic residential structures by vandalism and theft, security will be provided by fencing, lighting and security personnel.

Any existing foundations, porches, side walks, patios, driveways and landscaping will be cleared and materials disposed of appropriately.

#### **4.4.4 Shoring**

Shoring is anticipated to be used along the southern edge of the excavation to facilitate continuation of the remediation to the south. It is anticipated that this shoring will consist of driven/trenched sheet piles placed to facilitate a 10-foot tall vertical excavation. Sheet pile installation using standard vibratory equipment is expected to be difficult due to the possibility of boulders hindering advance of the piles. Removal of the boulders by trenching may be required. Typical anticipated excavation cross sections are shown on the attached drawings.

This same shoring method will be used as a contingency measure if additional excavation depth is required to achieve confirmation requirements outlined in this document and MTCA regulations. The installation of contingency shoring is anticipated to be similar to methods previously described in this section, although the top of the shoring may be at different depths as dictated by the particular situation. Additional sloping will also be used as a contingency measure as required by the particular situation. As detailed above, the contractor will prepare an excavation shoring design prior to excavation. The contractor's design will be presented in the Excavation and Shoring Monitoring Plan as part of the Technical Execution Plan.

The important aspect of the contingency measures will be the ability to determine the appropriate contingency measure(s) and implement them quickly so that progress is not slowed. Sheet pile shoring designs to accommodate a number of conditions will be determined prior to construction

so that they can be enacted when appropriate to accommodate sampling results.

#### **4.4.5 Cofferdams**

As outlined in Section 3.4. Two parallel cofferdams will be placed in the South Fork Skykomish River to divert the river away from the active excavation.

#### **4.4.6 Spill Response**

A spill response contractor will be retained to be on-call during the duration of the remedial action. The contractor will mobilize spill response materials such as booms and pads to the Project Area. The contractor will also be responsible for developing a spill response plan in compliance with Section S7 of the NPDES Permit. The Spill Response Plan will be included in the Technical Execution Plan.

### **4.5 Temporary Facilities**

Several temporary facilities will be in place during the implementation of the levee remedial action including access and haul roads, construction offices, utilities, fencing, sediment and erosion controls, staging areas, and spill/emergency equipment. Additionally, power, telecommunications, and water will be needed. Water will be supplied by the Town water supply instead of withdrawing water from the river.

#### **4.5.1 Access/Haul Roads**

The construction access and haul roads to the project site will be selected to ensure the maximum safety and efficient traffic flow. The northern half of the school yard may be used as the construction staging area, with the only available existing access roads to the Project Area being via 6<sup>th</sup> Street and West River Road. An entrance gate will be established at the south side of the school yard staging area. The proposed access/haul roads on Figure C-11 will be presented to Town officials, emergency personnel, and local residents for comment. It should be noted that construction is planned to not interfere with the school's drain field. The southern extent of remediation and associated shoring are placed so that no activity will occur over the drain field during this interim action for cleanup.

#### **4.5.2 Construction Offices**

There will be three construction offices: one for RETEC, one for the contractor, and one for Ecology. A temporary RETEC engineering field office will be located in the BNSF house on 5<sup>th</sup> Street. Contractor and RETEC trailers will be located in the rail yard. Temporary power and a telephone line will need to be installed to the trailers on the railyard. Ecology will establish their construction office location at a later date.

### **4.5.3 Utilities**

Utilities in the Project Area include power lines, telephone lines, and a storm drain system. Puget Sound Energy has been contacted to relocate the overhead power lines that are next to the levee excavation area. These lines, as well as the telephone line (Verizon) that runs on the same poles, will either be moved to private property on the south side of West River Road or these utilities will be rerouted through the lines on the south side of the school to the affected homes. The storm drain system in the project area will be replaced as part of this remedial action. The details of the temporary rerouting of utilities and the final permanent establishment of the utilities will be worked out with the utility companies, the Town and associated affected residents (where appropriate) prior to construction.

### **4.5.4 Enclosures and Fencing**

Temporary chain link fencing will be installed along the perimeter of the Project Area, and around all stockpile, excavation, staging, and work areas. Warning signs will be posted at every entrance gate and at least every 50 feet along the fence warning the general public that the project site contains physical and chemical hazards and that access is forbidden to unauthorized personnel. Additionally, a security guard will patrol the house storage area regularly and the project area after hours.

### **4.5.5 Sediment and Erosion Controls**

The sediment and erosion controls shall meet the following requirements and will be detailed and implemented in the Stormwater Pollution Prevention Plan (to be prepared):

- Use ditches, berms, pumps and other methods necessary to divert and drain surface water away from excavations and other work areas.
- Prevent sediment from entering the river, roadways, storm sewers, or catch basins.
- Any storm water coming in direct contact with source material or any other contaminants shall not be allowed to leave the project site.
- Divert seepage water into sumps and pump to storage tank for testing and, if necessary, on-site treatment or disposal at an approved off-site facility.
- Install a temporary outfall from the construction stormwater treatment system to the river as per NPDES requirements.

- Inspect and repair or replace damaged components of temporary erosion and sediment controls on a regular basis as described in the project specifications. Inspect immediately after rain or flooding events, and inspect daily during prolonged rain events.

#### **4.5.6 Staging Areas**

The staging area(s) will be used to store materials and equipment. There are four possible locations for staging areas. These include the rail yard, either end (east and west) of West River Road, the north end of 6<sup>th</sup> Street, and the northern half of the school yard. BNSF is currently negotiating with property owners regarding access. All staging areas will be secured with temporary fencing to restrict access to unauthorized personnel.

Since the drain field for the school is under the playground, no heavy materials will be stored near the playground on the drainfield. Heavy equipment will need to be staged in the rail yard. The recyclable levee materials not used in the cofferdam construction and dewatering tanks are the most likely items to be stored on the school yard. If the school yard is used, it will be returned to pre-existing conditions upon project completion, including reinstallation of chain-link fence and grass.

The Town has requested permission to use a portion of the Railyard north of the main line and west of the 5<sup>th</sup> Street crossing for parking during the annual antique car show scheduled for August 26, 2006. During this time heavy equipment that will usually be staged on the railyard may be staged at the Town's "burn dump," an approximately 1.6-acre area about a five-minute drive from town.

#### **4.5.7 Spill/Emergency Response Equipment**

Spill and emergency response equipment will be mobilized to the Project Area during the mobilization phase of the remedial action. This equipment will include oil absorbent booms and pads to capture any free-phase petroleum hydrocarbons that are released. The spill response contractor will be responsible for determining the types and quantities of materials and equipment to be kept on-site in the spill response plan. This plan is subject to Ecology approval.

### **4.6 Water Treatment Facilities**

The water treatment facility design is outlined in the *Draft Engineering Report – Levee Remediation Process Water Treatment and Discharge* (RETEC, 2005b) which was submitted to Ecology. The report provides the basis of design and process design considerations for treatment of the excavation water. Water treatment facilities will be operated in accordance with the NPDES permit issued for the treatment system.

## **4.7 Excavation**

The armor rock on the existing levee will be removed and the impacted rock will be segregated from the clean rock into separate stockpiles. The contaminated rock may be cleaned on-site using steam wash and reused for the new levee construction. If the impacted rock cannot be satisfactorily cleaned and reused, the rock will be disposed of at a licensed facility.

The levee materials will be removed from the existing levee and the contaminated fill (material with concentrations greater than 3,400 mg/kg NWTPH-Dx) will be segregated from the clean fill. The clean excavated embankment material will be stockpiled for reuse in construction of the new levee. Contaminated materials will be transported to the rail yard, stockpiled, placed in rail boxes, gondolas, or trucks and subsequently transported to a licensed Subtitle D landfill for disposal.

The remedial action will remove an estimated 70,000 cubic yards (cy) from the site. It is estimated that on the order of 20 to 30 percent of this total volume will be clean overburden, resulting in 49,000 to 56,000 cy being removed from the Project Area. The excavation area is shown on Figures C-13 and C-14. The impacted area was delineated based on the previous analytical and characterization results performed during the site investigation (Appendix B). The extent of excavation may vary depending upon the field conditions during excavation activities. Dry side slopes are expected to stand at a stable slope somewhere between 1.5H:1V (horizontal to vertical) to 2H:1V depending on soil conditions. However, it is anticipated that the bulk of the excavation will be completed in the wet. It is known that underwater angles of repose of unconsolidated sediments are much shallower than in the dry. A slope value of 4H:1V has been incorporated into the anticipated excavation prism below anticipated water levels. Debris encountered during excavation will be sampled and disposed of properly.

### **4.7.1 Screening of Oversized Material**

Excavation soil is expected to consist of mixtures of silt, sand, gravel, cobbles and boulders. Of these different grain sizes, contaminants are typically trapped in the finer portions of the soil, or in this case, the silt, sand and to a lesser degree the gravel. Unless there is a coating on the oversized material, very little contamination is retained in the coarse gravel, cobbles and boulders that are found in the deposit. BNSF may set up and operate a soil screening operation on the rail yard within the soil handling area to screen out material greater than 2 inches from the finer portions of the soil. The oversized material may be further split up to facilitate screening operations. The oversized material will be characterized in accordance with the SAP, and either disposed of, or cleaned as necessary and blended with backfill in the excavation.

## **4.7.2 Stockpiling Uncontaminated Soil and Sediment**

Overburden soil, excavated sediment, and material with TPH concentrations equal to or less than the RL of 3,400 ppm NWTPH-Dx will be stockpiled separately from material with TPH concentrations greater than the RL during the remedial action. Samples will be collected from the stockpiles in accordance with the sampling and analysis plan included in Appendix G. Results of the laboratory analytical testing will be used to determine the handling of the stockpiles. The material will be used as backfill on-site or designated for off-site disposal if the sample indicates concentrations greater than 3,400 ppm NWTPH-Dx. Soils containing concentrations less than 3,400 ppm NWTPH-Dx may be segregated into two piles: soil with concentrations less than 22 ppm NWTPH-Dx and soil with concentrations between 22 and 3,400 ppm NWTPH-Dx. Material with concentrations between 22 and 3,400 ppm NWTPH-Dx will not be placed in the watertable fluctuation zone. This material will not be placed as backfill under residences or the Levee but may be used on the Railyard, if appropriate.

A site layout plan showing areas available for soil stockpiling is included in the drawings. Some of the uncontaminated soil may be used to fill the flexible intermediate bulk containers (FIBCs) as part of the cofferdam. Appropriate erosion and sedimentation controls will be put in place to prevent run-on and run-off.

## **4.7.3 Transportation and Disposal of Contaminated Materials**

Excavated contaminated materials (material with TPH concentrations exceeding the soil RL of 3,400 ppm NWTPH-Dx) from the excavation will be loaded into dump trucks and transported to a lined spoils staging area on the railyard. The dump trucks will be lined if necessary to prevent leaks and spills of any liquid, sediment or soil on the Town roadways. The spoils will be amended with fly ash or other stabilizing agent as required to pass the paint filter test prior to being loaded into rail shipping containers or into over-the-road trucks for shipment to a licensed disposal facility.

## **4.7.4 Confirmation Sampling and Testing**

Once excavation has proceeded to the required depths using pre-excavation data and on-site inspections, the water in the excavation pits will be allowed to settle (“cleared”) while any visible sheen and petroleum products will be removed via skimmer or pump to the NPDES-permitted treatment system. The approximate time for water to clear is expected to be within one hour depending on the size of the pit, and rate of water removal. The reason that water clearing is desired is that silt/clay particles in the water within the pit may be impacted. Extracting a sample from the bottom of the water column and bringing it up through the water column may result in contamination levels in the sample that are higher than the in-place soil due to the influence

of these fine particles that may remain in suspension. An additional consideration is that the surface water may have a constant sheen despite soil and sediment concentrations being below the applicable remediation and cleanup levels. Skimming and pumping operations will be used to address any sheen present.

Once “clearing” has occurred, a post-dredge sample will be collected from the pit (using the excavation equipment) and prepared for analysis. This may be performed at an on-site lab or prepared for expedited shipment for off-site analysis. Logistical considerations must be made for continued excavation of other areas between the time samples are taken and results are obtained. In the event that water in the pit doesn’t clear in a reasonable amount of time due to silt or other suspended solids, the sampling plan will be modified. Refer to the SAP provided in Appendix G for additional details of confirmation sampling and testing.

The south sidewall will not attain remediation levels during the levee replacement as the uplands cleanup in the Northwest Developed Zone will be completed as a separate phase of the cleanup.

#### **4.7.5 Dewatering**

The river stage at the time of construction will dictate the excavation and dewatering methods utilized. It is anticipated that excavation a few feet below the level of the river can be completed in a relatively dry state by pumping from sumps within the excavation. However, it is anticipated that the bulk of the deeper portions of the excavation will be performed in the wet. A nominal water treatment capacity of 500 gpm (maximum 1,000 gpm) will be available for the entire levee cleanup project as per the NPDES permit. Therefore, the contractor will need to select an excavation method and dewatering design and operation within the water treatment capacity constraints. Several intake locations will be provided. The following dewatering standards shall be adhered to:

- Establish a dewatering plan to describe the methods, equipment and operation to collect and store water from disturbed areas.
- Set up site controls to divert and collect water from disturbed areas to allow for remediation activities to be conducted.
- Excavation areas are not expected to be dewatered to maintain a relatively dry work area during the entire period that the excavation remains open. Excavations and backfilling below about 917 feet will likely be done in the wet depending on the river level.

- All dewatering equipment shall be provided and maintained by the Contractor to ensure sufficient capacity to meet the requirements for the removal of water in the disturbed areas.
- BNSF's Contractor shall grade the excavation area using slopes, berms and sumps in conjunction with dewatering systems to channel water away from the immediate work areas to minimize dewatering.
- BNSF's Contractor shall be responsible for preventing impacted water from leaving the site.
- BNSF's Contractor shall monitor the weather and site conditions 24 hours per day, seven days per week and perform dewatering as necessary to prevent impacted water runoff from the site.
- Liquids generated from dewatering processes will be collected.
- The water will be treated using the permitted water treatment system. After treatment to meet the required standards, the water will be returned to the river in accordance with an NPDES permit.
- An operations and maintenance plan will be developed in accordance with the NPDES permit guidelines in Section S4 that will outline around the clock operations, contingencies, and emergency procedures for the water treatment system.

## **4.8 Monitoring**

### **4.8.1 Air Monitoring**

An air monitoring program will be implemented during construction to ensure the air quality meets the criteria established in the site-specific Health and Safety Plan (HASP) and air monitoring plan. The purpose of the air monitoring program will be to ensure protection of site workers and nearby residents from airborne particulates and petroleum vapors. The air monitoring plan will outline perimeter monitoring stations and site-specific action levels for airborne particulates and petroleum vapors.

### **4.8.2 Surface Water and Discharge Monitoring**

The effluent from the construction water treatment system must be sampled and submitted for chemical analysis in accordance with the National Pollutant Discharge Elimination System (NPDES) permit. Surface water monitoring will be conducted in accordance with 401 Water Quality Conditions (see Section 2.3.1) issued via the Corps Nationwide permit and the Water Quality Significant Requirements under the MTCA Agreed Order for this work.

### **4.8.3 Cofferdam Monitoring**

The cofferdams will be monitored during the remedial action to ensure that minimum leakage into or out of the active excavation area occurs. Should a breach of either cofferdam occur, work will immediately be stopped and measures will be taken to repair the dam. The on-call Spill Response contractor will be called in as needed to recover any substances that have accidentally been released.

### **4.8.4 Performance Monitoring**

WAC 173-340-410 outlines monitoring for final cleanup actions. This work is an interim action for cleanup and will include protection and performance monitoring. Protection monitoring will be conducted to “confirm that human health and the environment are adequately protected during construction and operation and maintenance period” (WAC 173-340-410). Protection monitoring will consist of air monitoring for workers and neighboring residents. Performance Monitoring will be conducted to “confirm that the ... cleanup action has attained cleanup standards.” Soil and sediment samples will be collected at the limits of the excavation to confirm that the applicable remediation and cleanup levels have been attained.

Since the levee cleanup action is a component of the Ecology’s overall cleanup plans for the site, a compliance monitoring plan will be developed and implemented in conjunction with the overall site-wide CAP and CD. This compliance monitoring plan will include a long-term sediment and groundwater monitoring plan with contingencies.

## **4.9 Backfilling**

Backfilling will take place after the limits of excavation have been reached and applicable cleanup and remediation levels have been attained. In the event that field conditions such as depth of contamination make it infeasible to attain remediation and cleanup levels, backfilling may proceed with Ecology approval. Imported backfill will be analyzed for indicator substances to demonstrate it contains no hazardous substances exceeding MTCA Method A or site-specific cleanup levels, whichever is more conservative. Recycled overburden will meet site-specific cleanup levels. The imported backfill material will be clean, free-draining sandy and/or gravelly soils. Samples of the proposed import backfill will be approved by the site construction engineer-in-charge prior to use. Sediment backfill will consist of material similar to that removed and of appropriate quality for salmon rearing.

Backfill material for the excavation areas will include stockpiled clean excavated soil or approved additional imported soil. Significant compaction of the backfill placed in standing water will not be feasible. Backfill placed in standing water will be free-draining, granular material that can be placed in a fairly compact state in standing water. Larger (4 to 8 inch) rock may be

mixed into the backfill that is placed in standing water that is below residential structures to make sure that the fill performs as desired with minimal settlement.

Backfill above the water table will be placed in maximum loose lifts of one foot and compacted to at least 90 percent maximum dry density as determined by ASTM D-1557 for the material placed in the river and in the levee foundation, and 95% of ASTM D-1557 for the levee itself for areas below residential structures, and within the upper two feet of fill below the planned roadway surface. There may be isolated areas where backfill has to be placed in the wet in standing water. This backfill shall be placed and compacted to the maximum extent practical. Compaction testing of this material will not be possible. The ground surface of the backfilled excavation areas will be graded to the final elevations indicated on the design drawings.

## **4.10 Replacement and Restoration**

Regardless of the type of foundations (basements, concrete foundations, slab on grade, or post and pier foundations) currently existing beneath the five residences to be relocated, new concrete crawl space foundations will be designed and constructed for all of the buildings. Building codes will require this as a minimum due to seismic requirements. Town Ordinance 255 may require existing foundations to be raised for flood protection. BNSF is working with the Town to ensure that all work complies with Town codes and ordinances. Following construction of foundations, the buildings will be moved back to their original locations and placed on top of the new foundations. Utility infrastructure will be restored and utilities will be reconnected. Site features specific to each residence will be restored including but not limited to replacement of topsoil, porches, sidewalks, garages, sheds, patios, driveways and landscaping. Repairs will be made to damage resulting from moving of the buildings such as crack repair and repainting as needed based on documentation of the current condition of the buildings.

Roadways demolished as part of this interim action for cleanup will be replaced according to King County Road Standards (1993) and any damage to existing roadways and sidewalks will be repaired in kind. Utilities including power, telephone, and stormwater drainage along West River Road will be restored to initial or better conditions. Any hard surfaces that are damaged as part of this remediation effort will be replaced in-kind when excavation and backfill is completed. For instance, if an existing asphalt area is damaged during construction, it will be patched with asphalt.

## **4.11 Stormwater Sewer System**

The Town's existing stormwater sewer system within the footprint of the excavation will be demolished during the implementation of the remedial

action. A replacement stormwater sewer system has been designed and is detailed in Figures C-22 and C-23. The calculations used in designing the stormwater sewer system are provided in Appendix H, Stormwater System Design.

## 5 Levee Construction Control

This section focuses on the construction phase of the project. The USACE will not require BNSF to prepare a Construction Quality Plan because the work being completed is a MTCA cleanup. The lines and grades of the levee will be controlled by progress surveys to be done by the contractor and periodically checked by RETEC or an independent surveyor under contract to RETEC.

Shoring will be controlled by the contractor, but copies of shop drawings and calculations will be submitted to RETEC for review. All other activities will be controlled as laid out in the plans, specifications, and EDR. RETEC will provide oversight to other BNSF contractors to document conformance with the plans, specifications, and the EDR.

### 5.1 Habitat Restoration

Restoration will occur in the disturbed area of the river as well as along the levee. River bottom substrate will be replaced in the disturbed area and matched to existing substrate types. Amenities will be added to the shoreline that will improve habitat quality for salmon. Improvements include placement of large woody debris (LWD) in the riverbank. The LWD will provide cover for juvenile salmonids and will create areas along the shoreline with slower flows. Boulders will be placed just upstream of the woody debris to protect recreational users of the river from floating into the debris.

Once the new levee is constructed, native vegetation will be replanted along the waterward face. The newly planted vegetation will provide cover and foraging opportunities for migrating juvenile salmonids along the toe of the new levee during high flows. A planting plan is included in the Biological Evaluation submitted to the USACE (Grette Associates, 2005) and in the drawings attached to this document. Vegetation is to be placed above the ordinary high water mark (OHWM). The OHWM is based on the annual, or 1-year, flood level of 922.0 feet.

Landscape planting on the levee will enhance the environment and help preserve the natural resources. The landscaping must meet all federal, state and local laws and necessary permits must be obtained, if applicable. The design criteria for landscaping on the levee include:

- 1) **Vegetation-Free Zone:** The vegetation-free zone is an area provided for access to the levee for maintenance and flood-fighting (i.e. sandbag placement) activities. No vegetation will be planted in this zone.
- 2) **Shrubbery:** Shrubs tolerant of flooded conditions will be placed along the levee bench to the top of the levee slope. Clusters of

trees will be placed along the top of the levee slope in areas consistent with view corridors created as part of the design.

- 3) **Topsoil:** One foot of topsoil will be placed along the levee face to facilitate plant growth. In addition, a topsoil or topsoil/sand mix will be placed between boulders (upper four feet). Following topsoil placement, coir mesh (which will slowly decompose) will be placed along the levee to prevent erosion.

Safety and stability of the levee structure is the most important consideration of the design. Maintenance of the completed structure should be coordinated through local agencies during planning and design, and it must be determined if the responsible local agency has the capability to maintain the restored levee upon completion of the project. It is BNSF's understanding that King County will maintain the restored levee.

## 5.2 Levee Landscaping and River Access

Where possible, the Town recommendations for the levee design have been included in the EDR. In addition to specific recommendations included in Resolution No. 213, the Town has participated throughout the levee remediation design process and has participated on design decisions throughout the design process. The following amenities and enhancements have been included in the design at the Town's request:

- Direct water access at 5<sup>th</sup> Street (*optional*).
- A trail along the length of the top of the levee (*optional*).
- Access to the levee trail at two points (5<sup>th</sup> Street & west of the school grounds) – access at the north end of 6<sup>th</sup> is not possible while maintaining the King County standard width for West River Road (22 feet) and King County surface water management levee width requirements to allow for access by levee maintenance equipment (*optional*).
- A river outlook structure is provided at 6<sup>th</sup> Street intersection (*optional*).
- West River Road will be widened to 22 feet per King County standards. A retaining wall will be used to accommodate the widening of the road.

Other recommendations that are considered optional during the subsequent design phases include a boat launch, professional landscaping, decorative patterns/colored concrete for retaining wall, colored railings, conduits/wires for future installation of electrical, phone and cable infrastructure, installation

of below ground power and telephone lines, and installation of a sprinkler system. With the exception of the sprinkler system these enhancements are considered “optional” because they are not required as part of the cleanup and/or levee reconstruction. It will be at BNSF’s discretion whether or not to implement these portions of the Town’s vision, or whether the Town will have to fund/complete this work themselves.

## **5.3 Community Concerns**

It is BNSF’s and Ecology’s goal to implement this interim action for cleanup in a manner that addresses public concerns. Concerns identified in this section are in part based on previous experience implementing interim actions and investigation work at the site, and through working closely with Town representatives throughout the design process. The Public Participation Plan (to be revised spring 2006) for the project identifies other methods for obtaining public input, including meetings with the Skykomish Town Council, Skykomish School Board, and the Skykomish Environmental Coalition (SEC). Issues and/or concerns identified by these public involvement efforts are identified in this section. This draft EDR, along with a draft EIS is being provided for public review and comment to help explain the cleanup action and obtain further public input. Should any additional issues/comments/concerns arise from the public review, they can be addressed in the final design documents.

The following is a summary of issues/concerns and how BNSF is responding to these concerns.

- **Disruption to School.** The levee remediation construction work will create noise and traffic disruption that can not be avoided to the Skykomish School due to its proximity to the levee. BNSF is working with the Skykomish School District to obtain access to a portion of their playground for use as a staging area. As part of these discussions, the school has generously offered to modify their 2006-2007 school calendar to accommodate the project. Construction work north of the levee (below the high water mark) can not begin until July 1, 2006 based on the “fish window.” However, it is likely that equipment mobilization to the site and moving of residences will begin June 1, 2006, and construction work on and south of the levee will begin mid-June 2006, at the latest. Every effort will be made to coordinate the initiation of work in June 2006 with the end of the 2005-2006 school year. All work on and north of the levee must be completed by September 15, 2006 unless the entire levee construction is postponed due to unusually high river levels. Equipment demobilization and the majority of the disruptive work should be completed prior to Monday, October 2, 2006. This might be an appropriate date for school to begin for the 2006-2007 school year, if the district is

flexible. Further, since the school yard will likely be needed as a staging area for subsequent remediation work in other parts of Town, it may not be worthwhile restoring the school yard during the fall of 2006. In this event, arrangements will be made to provide the school/students with transportation to an alternate play field (e.g., Skykomish ball field). In addition, a flagger or traffic control officer may be employed and strategically located throughout the duration of the project when school is in session.

- **Disruption to Town.** The levee remediation construction work will create noise and traffic disruption to the Town that can not be avoided. Also, a portion of Railroad Avenue adjacent to the railyard has been identified as a staging area for the project. A temporary road will be constructed west of the school to provide access for residents located at the west end of West River Road.
- **Disruption to Residents.** The levee remediation work will create noise and traffic disruption, as well as temporary power shut off, to residents located immediately south of the excavation area. Five residences/families along and near West River Road will be temporarily relocated. Access for emergency response vehicles (fire, ambulance) will be maintained at all times. A temporary road will be constructed west of the school to provide access for residents located at the west end of West River Road. It is anticipated that most construction work will occur during daylight hours, 7:00 a.m. to 7:00 p.m. It is also anticipated that the construction water treatment plant may operate 24 hours per day and that some construction activities may extend past daylight hours on occasion. It is currently anticipated that work will occur Monday through Saturday in order to complete work during the fish window.
- **Disruption to Business.** With previous projects, businesses have indicated concerns regarding disruption and aesthetics. In general, the contractor will be required to maintain a neat and orderly operation within the limits of their work areas. Signage related to the project will be that typical of a road construction project with traffic controls and authorized personnel access.
- **Excavated Materials Handling.** Excavated materials from the work zone, identified for off-site disposal, will be immediately moved to the railyard for temporary storage prior to rail or truck shipment to the disposal facility. A temporary spoils stockpile area will consist of a lined and bermed storage cell.
- **Dust.** Excavation work is anticipated to generate dust. Engineering controls, such as application of water, will be used to

minimize dust generation, and the Site-Specific Health and Safety Plan and air monitoring plan (to be prepared under separate cover) will specify air monitoring requirements and limits for nuisance dust. In the event specified limits for nuisance dust and volatile gases are exceeded, the health and safety officer on site will assess the concern and take appropriate action (the on-site health and safety officer will have authority to immediately stop work if necessary and notify Ecology thereafter). No health and safety concerns are anticipated to persons on adjacent properties.

- **Restricted Access to Construction Zone.** A project exclusion zone will be designated in the Site-Specific Health and Safety Plan. Unauthorized personnel and persons without adequate HAZWOPER training will not be allowed inside the exclusion zone. The exclusion zone will be marked using temporary fencing, caution tape or other appropriate means.
- **Traffic.** Temporary traffic plans for the West River Road corridor are provided in Figure C-11 for review by all affected agencies and persons including fire department, police department (county and state), residents and the school.
- **Use of Local Businesses and Personnel.** BNSF and its contractors will use local businesses to the extent practicable. BNSF will encourage use of local motels/hotels, restaurants and supply vendors by personnel involved with the project. The contractor will be encouraged to use local labor to the extent practicable.
- **On-Site Personnel.** In addition to contractor personnel, at least one RETEC or BNSF project supervisor representative will be on-site at all times that field work is in progress. This supervisor may be the site health and safety officer, and will restrict access to the active work zone by any unauthorized individuals including children. In addition, Ecology personnel or Ecology contractors will be present on site during all times work is in progress, along with public participation personnel (EnviroIssues and/or Ecology) to address public concerns and answer questions about the work.
- **Glare.** Although it is not anticipated that construction activities will occur outside of daylight hours, portable construction lighting may be necessary due to construction delays or timing constraints that make working during the evening hours necessary. Light and glare impacts caused by portable construction lighting would be directed away from homes and roads as much as possible and focused on the work areas. The lights would be shielded and turned off when not necessary.

## **5.4 Schedule**

Construction below the OHWM and all work in the river will take place between July 1st and August 31<sup>st</sup> to accommodate the fish window. Depending on the final decision by the Department of Fish and Wildlife, the fish window may be extended. This work is anticipated to be completed in 2006. However, if unusually high river levels preclude work in 2006, 2007 will be targeted for the work. The construction method for the levee remediation includes installing primary and secondary cofferdams, shoring, excavation, and backfill. The levee construction is anticipated to proceed in the following sequence:

### **To Be Completed Prior to July 1**

- Set up temporary facilities and site controls, including fencing, job trailers, staging areas, access roads and other requirements as specified
- Clear and dispose of the debris and vegetation (including brush and trees) on the existing levee
- Relocate utility lines along south side of levee
- Move affected buildings
- Begin removing the armor rock and embankment fill from existing levee down to ordinary high water mark and stockpile
- Fill FIBCs with “recyclable” levee material (or imported materials) for cofferdam construction
- Install the shoring on the south boundary of the excavation.

### **To Be Completed Between July 1 and September 15**

- Install two parallel cofferdams and tertiary containment (booms) along the north edge of the excavation prism.
- Excavate the levee and underlying contaminated material; the approximate excavation depths have been determined in accordance with the remediation levels described in Section 3 of this report and the results of the field test boring program (Appendix B). The lateral and vertical extent of the excavation prism may be modified at the time of the excavation based on monitoring data collected during the excavation.
- Transport contaminated rock/fill materials via railcar or truck to a Subtitle D landfill for disposal.

- Import material to replace the contaminated material.
- Reconfigure the levee to the lines and grades shown on the drawings and per the specifications, and install retaining wall.
- Install infrastructure requested by Town (under negotiations between BNSF and the Town).

### **To Be Completed After Levee Replacement**

- Install storm sewer
- Replacement and restoration of affected buildings and install individual replacement septic systems.
- Plant new vegetation on the face of the levee as specified in the design.
- Asphalt patching of damaged portions of W. River Road pending uplands cleanup
- Construction of paths, outlook (under negotiations between BNSF and the Town)
- Installation of lighting (may be necessary to postpone until after cleanup or NWDZ is complete)
- Landscaping of levee crest and town side of levee (under negotiations between BNSF and the Town)
- Demobilize equipment and personnel
- Utility installation.

## **6 Construction Quality Assurance**

This section discusses construction quality assurance for the project, including the quality assurance structure, responsibilities and requirements. Quality assurance includes compliance with health and safety requirements and performance standards outlined herein and within the specifications

### **6.1 Quality Assurance Monitoring Structure**

All aspects of construction will be performed under the oversight of a RETEC professional engineer registered in the State of Washington or a qualified field technician under the direct supervision of RETEC professional engineer registered in the State of Washington. A BNSF Engineer or qualified representative will be on-site throughout construction and will be responsible for ensuring compliance with the performance standards outlined in Section 5.2.2.

### **6.2 Construction Quality Requirements**

#### **6.2.1 Health and Safety**

As outlined in Section 2.2.1, personnel involved in the construction of the project will be required to comply with the health and safety training requirements commensurate with the task(s) they are performing. BNSF Contractors and subcontractors who may come into contact with hazardous materials are required to use workers trained for hazardous waste work. The contractor personnel will also obtain BNSF Contractor Orientation training to work in the railyard. It is the remedial contractor's responsibility to meet all the requirements of WAC 296-155, Safety Standards for Construction, and the applicable provisions of the hazardous waste operations regulations, WAC 296-62, Part P and 29 CFR 1910.120. The Contractor shall also have a site health and safety (H&S) officer who will ensure that all contractor personnel adhere to H&S regulations. Prior to starting work, the BNSF Contractor shall submit an H&S plan to the BNSF Engineer for review. The plan shall include written documentation of employee training and medical certifications as required under WAC 296-62, Part P. Documentation of the following items is required for each site worker where work falls under the requirements of WAC 296-62, Part P:

- Initial 40-hour health and safety training and annual 8-hour refresher training
- Eight-hour supervisory training, required for the field supervisor
- Medical clearance from a licensed physician certifying that the worker is fit to participate in field activities and use personal protective equipment

- Current respirator fit test certification
- Current CPR and first aid certification for at least one member of each crew
- Provision of personal protective equipment for each worker at the highest level of protection for this site (Level D).

## **6.2.2 Performance Standards**

Performance standards address environmental and public health issues, such as emission control and compliance with environmental regulations. Monitoring efforts of the Engineer will be conducted to demonstrate compliance with performance standards.

The following sections identify performance standards for activities at the site. Table 6-1 lists the construction performance standards and the contractor quality assurance testing requirements.

**Table 6-1 Construction Performance Standards**

Standard	Parameter	Level of Performance	Testing Method or Specification	Frequency of Testing	Comments
<b>Preconstruction Testing</b>					
Backfill	Gradation	Granular material with less than 15% non-plastic fines (passing the #200 sieve) will be used above standing water. Granular material with less than 10% fines will be used below standing water.	ASTM D4318 ASTM D422	For each source	Backfill not exceeding MTCA Method A CULs.
<b>Construction Testing</b>					
Grading	Grade	Within 1.5 inches	Field Surveying	Continuous	
Emission Controls	Dust	< 5 mg/m <sup>3</sup> OSHA PEL	MiniRam and Site Perimeter Monitoring	Continuous	Contractor shall provide dust suppression measures
Surface Water Quality	Turbidity Oil	No excessive turbidity No sheen outside of containment area	Turbidity Monitoring Visual	Continuous	Implement Permits
Backfill Compaction	Density	Material below the base of the levee and above standing water shall be compacted to at least 90% ASTM D-1557 density. Material in the levee itself shall be compacted to at least 95% ASTM D-1557.	ASTM D1557 ASTM D2922	One test event per 750 CY of fill placed.	
		Material outside of the levee and above standing water will be compacted to 90% ASTM-D-1557, except below residential structures and within 2 feet of the roadway surface where fill will be compacted to 95% ASTM D-1557.	ASTM D1557 ASTM D2922	One test event per 750 CY of fill placed.	
		Backfill placed below standing water will be placed as compact as practical, but no testing can be completed.			
Retaining Wall Elements	TBD	To be determined upon final determination of retaining wall type.			

## **Backfill**

Chemical testing and gradation of backfill will be required for each source. Analytical testing will be performed for selected analytes to ensure that backfill does not exceed MTCA Method A or site-specific cleanup level concentrations. Gradation testing will ensure that the import material is free of deleterious material and is non-plastic. Testing will comply with ASTM D4318 and ASTM D422.

## **Emission Controls**

Excavation, grading, and capping activities will be carried out in a manner that controls emissions of odors and dust (fugitive emissions). Dust and vapor monitoring will be carried out according to an Ecology approved monitoring plan (to be submitted under a separate cover). This plan will detail the location of perimeter monitoring stations for dust and organic vapors and present action levels that will protect workers and residents surrounding the site. The Contractor will provide measures to suppress fugitive dust generated during site grading that the BNSF deems excessive based on visual and other monitoring criteria.

## **Excavation and Shoring Monitoring**

An excavation and shoring monitoring plan will be developed and implemented jointly by RETEC and the contractor chosen to perform the work, and will be subject to Ecology review. The plan will address monitoring activities that will be necessary to demonstrate that the excavation slopes and shoring are performing as designed, and mitigation plans that will be required if performance is not as anticipated. This plan is being developed after the contractor is chosen for the work since the contractor will design the shoring and it may differ from the shoring envisioned at this time.

### **6.2.3 Record Keeping and Reporting**

Records will be maintained by onsite RETEC/BNSF representatives to document the work performed. These records include, but are not limited to, the following:

- **Daily Activity Log.** A daily activity log will be completed to describe general site activity and personnel working on-site. The records may be used to substantiate invoices as related to measurement and payment of site work. Health and Safety levels will also be noted in the daily logs as well as field H&S monitoring.
- **Material Testing Results.** All material testing results will be maintained. Material testing logs will, at a minimum, include the

date and time of testing, testing site and location, identification of tester and company, test results, and any relevant comments.

- **Completion Report.** Upon completion of remedial activities, the Engineer will submit a draft completion report as required in WAC 173-340-400(b)(ii) by March 30, 2007 for work completed prior to December 31, 2006 and another draft report by July 31, 2007 for work completed between January 1, 2007 and June 30, 2007. The reports will include as-built drawings, work accomplished, materials used, inspections and tests conducted, results of inspections and tests, nature of defects found (if any), and corrective actions taken.

## 7 References

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## Figures

**Appendix A**  
**Levee and Barrier Wall As-Built Drawings**

**Appendix B**  
**River and Levee**  
**Supplemental Site Investigation Report**

**Appendix C**

**South Fork Skykomish River**  
**Mean Discharge Ranking in Summer**

**Appendix D**  
**Scour Hydraulic Analysis**

**Appendix E**  
**Dewatering Calculations**

**Appendix F**  
**EDR Amendment Form**

**Appendix G**  
**Sampling and Analysis Plan**

## **Appendix H**

### **Stormwater System Design**